

**A REVISION OF THE GENUS LEPTOCORIS HAHN (HETEROPTERA: COREIDAE: RHOPALINAE) FROM THE INDO-PACIFIC AND AUSTRALIAN REGIONS**

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Plate xlviii and text fig. 1-4

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## ABBREVIATIONS

The following abbreviations have been used for Institutions in which the material used in this revision is lodged. A.M., Australian Museum, Sydney; B.M., British Museum (Natural History); B.P.B.M., Bernice P. Bishop Museum, Honolulu; C.N.H.M., Chicago Natural History Museum, Chicago; C.S.I.R.O., Commonwealth Scientific and Industrial Research Organization, Canberra; K.U., Kyushu University, Fukuoka; N.M., National Museum, Melbourne; R.M., Rijksmuseum, Leiden; S.A.M., South Australian Museum, Adelaide; U.Q., Entomology Department, University of Queensland, Brisbane; U.S.N.M., United States National Museum, Washington; W.A.M., Western Australian Museum, Perth; and Zool. Inst. Halle, Zoologisches Institut, Halle-Wittenberg.

## INTRODUCTION

The species of the genus *Leptocoris* Hahn 1831 (= *Serinetha* auctt.) for many years have been difficult to separate in the Indo-Pacific region.

My first introduction to this problem was an attempt to identify the Australian specimens of the genus in the various Australian Museum collections. Most of the medium sized species were labelled *lurida* (Dallas), the larger *abdominalis* (Fabr.) and a small unnamed species from Central Australia was evidently *vulgaris* Bergroth. In an effort to find more satisfactory taxonomic characters I dissected out the male and female genital capsules of a series of specimens and it was soon evident that there were only three very distinctive species involved. The medium sized group belonged to two species and it was possible to identify one section of these with the name *mitellata* Bergroth because of the presence in most (but not all) of a distinctive red spot on the hemelytra; this is mentioned in Bergroth's description. The remaining medium sized specimens belonged to the same species as the small *vulgaris* whilst the largest specimens represented another species.

The search for the correct names of these latter two species involved examination of specimens from many collections ranging over the whole of the Indo-Pacific region, while even some African and the two American species were examined for possible synonymy. This survey revealed that the male genitalia belonged to only seven very distinct types and that using the male genitalia as a basis of classification a variety of forms quite different in general appearance belonged to the same species, whereas in other cases specimens of

almost identical appearance in colour and general shape belonged to different species. The female genitalia were not quite so distinctive in many cases, but in the several species (*abdominalis* and *rufomarginata*) where a number of varied individuals came together in the range of one species, whilst others very similar were referable to the other on the basis of the male genitalia, the female genitalia proved to be very different from each other and gave the same result.

The number of male genital types seen has now been extended to thirteen (following the examination of some unique types) and it appears that each one of these represents a distinct species. The names applied at various times to the Indo-Pacific species of *Leptocoris* number thirty-one. The types of five of these can no longer be traced (*tagalica* Burmeister, *rufus* Hahn, *mitellata* and *vulgaris* Bergroth, *laprobanensis* Dallas, and *taitensis* Guérin). One of the thirteen species appears to be new.

### SYSTEMATIC

#### Genus *Leptocoris* Hahn 1831

*Leptocoris* Hahn 1831: Wanz. Ins., 1: 200. Burmeister, 1835: Handb. der Ent. 2: 305. Stål, 1870: Kongl. svensk. Vetens. Akad. Handl., 9 (1): 226. Distant, 1882: Biol. Centr. Amer. Heter., 1: 172. Uhler, 1886: Check List, 13. Kirkaldy, 1905: Trans. ent. Soc. Lond., 350. 1908: Entom., 41: 123. Distant, 1908: Entom., 41: 47. Van Duzee, 1917: Cat. Hem. Nth. Mexico, 123.

*Serinetha* Spinola, 1840: Essai sur les Hémipt., 247. 1850: Tavola Sinot., 37. Dallas, 1852: List. Hemipt. Ins., 2: 459. Stål, 1862: Stett. ent. Ztg., 23: 306. 1865: Hem. Afr., 2: 112. 1873: Kongl. svensk. Vetens. Akads. Handl. 11 (2): 98, 99. Lethierry & Severin, 1894: Cat. gén. Hém., 2: 122. Distant, 1902: Faun. Brit. Ind. Rhynch., 1: 418. Bergroth, 1913: Mém. Soc. ent. Belg., 22: 164. Villiers, 1952: Hémipt. de l'Afrique noire, 108.

*Lygaemorphus* Blanchard, 1840: Hist. des Ins., Hémipt., 116.

*Pyrrhotes* Westwood, 1842: Cat. Hem. Ins. Coll. Hope, 2: 6.

*Tynotoma* Amyot and Serville, 1843: Hémipt., 220.

*Boisea* Kirkaldy, 1910: Proc. Haw. Ent. Soc., 2: 123 (as a subgenus).

The species of this genus in this region belong to several groups if the shape of the male genital capsule is taken as the sole guide.

In the first group the ventral part of the penultimate segment of the capsule is produced beyond the furthest posterior extension of its

dorsal part but it is never produced very far or thrown into distinct lobes or processes. To this group belong *augur* (Fabr.) and *minuscula* Blöte and also some African species (*e.g. intermedia* Dist.).

In *coimbatorensis* sp. nov. and *corniculata* (Stål) the ventral part of the penultimate segment is not very much more produced than in the *augur* group, but is thrown into four short or medium sized lobes. To this group also belong the two American species *trivittatus* (Say) and *rubrolineata* Barber (both of these seem to have almost identical male genitalia and may be only sub-specifically distinct) and some African species (*e.g. fulcratus* Germ.)

In the Australian *mitellata* Bergroth is seen the first development of the general Indonesian and Pacific region type of male capsule in which the male penultimate segment is produced markedly posteriorad by being thrown into two prominent lateral lobes (parandria) and medially into a slender laminate (in the vertical plane) or triangular (in the horizontal plane) process which extends posteriorad up between the claspers. In *mitellata* these parandria are vaguely triangular in cross section and somewhat bifid at apex.

In *vicina* (Dallas), *subrufescens* (Kirby), *cozalis* (Kirby), and *abdominalis* (Fabr.) the parandria are circular in cross section and nearly as long as the claspers.

In *rufomarginata* (Fabr.) *tagalica* Burmeister, *isolata* (Distant) and *marquesensis* Cheesman the parandria are flattened or even shallowly concave on the upper and inner face and rounded below and are therefore vaguely semicircular in cross section. This is the only type to be found in the Eastern Pacific.

The males can be separated by the following key. The female genitalia in several cases are not so distinctive and it has not always been possible to key right down to species.

Key to Indo-Pacific species of *Leptocoris*—Males:—

1. Male genital capsule with ventral part of penultimate segment (pygophore) produced posteriorad to about the level of, or just surpassing anal segment. Apex of penultimate abdominal segment truncate or sinuate but never produced into distinct lobes . . . . . 2

- Male genital capsule with ventral part of penultimate segment surpassing level of anal segment, and its apex thrown into two cylindrical or flattish lobes or four short lobes . . . . . 3
2. Apical margin of penultimate segment of genital capsule almost truncate. Clasper with a prominent outwardly and downwardly directed process on its outer margin about halfway along its length, and with a concave area on its ventral surface near apex . . . . . *augur* (Fabr.)
- Apical margin of penultimate segment of genital capsule sinuate. Clasper without a ventero-lateral tooth but fairly thin and only slightly concave on the under surfaces . . . . . *minuscula* Blöte
3. Ventral apical margin of pygophore sinuate with only two vague lobes, one either side of mid line. Lateral margin widened at level of clasper, produced inwards and bearing a short cylindrical process alongside the clasper. A prominent tubercle on either side of head in front of eye . . . . . *corniculata* Stål
- All lobes of apical margin of pygophore whether two or four more massive and conspicuous. Without a conspicuous tubercle on either side in front of eye, although there may be an oblique keel running down from centre of vertex to insertion of antennae . . . . . 4
4. Apical margin of penultimate segment of genital capsule thrown into four flattish lobes. Claspers flattish . . . . . *coimbatorensis*, sp. nov.

- Apical margin of penultimate segment of genital capsule thrown into two long lobes, cylindrical, flattened, or semicircular in cross section. Claspers never completely flat, but always in some section semicircular or semicircular with a concave ventral surface . . . . . 5
5. Lobes of penultimate segment of genital capsule flattened circular in cross section, slightly bifid at tip. Claspers massive . . . . . *mitellata* Bergroth
- Lobes of penultimate segment of genital capsule never bifid at tip. Claspers usually slenderer . . . . . 6
6. Lobes of penultimate segment of genital capsule circular in cross section . . . . . 7
- Lobes of penultimate segment of genital capsule vaguely semicircular in cross section, with the upper surface often slightly concave . . . . . 10
7. Male claspers in the form of a longitudinal somewhat curved plate basally, giving off distally a sinuate elongate process . . . . . *abdominalis* (Fabr.)
- Male claspers broader, rounded above, slightly concave below, very nearly the same size for all their length . . . . . 8
8. Lateral lobes (parandria) of penultimate segment of genital capsule curved inwardly towards apex . . . . . *coxalis* Kirby
- Parandria almost parallel . . . . . 9
9. Parandria with a noticeable groove running most of their length above . . . . . *subrufescens* (Kirby)

- Parandria smooth dorsally, without a prominent groove . . . . . *vicina* (Dallas)
10. Parandria of pygophora as long as claspers, markedly concave on upper and inward surface. Parameres fairly thin and not very elaborate . . . . . *tagalica* Burmeister
- Parandria not as long as claspers, less concave above . . . . . 11
11. Parameres prominently hooked at apex, thence becoming broad and laminate before roughly circular basal part. Produced ventral part of pygophore only vaguely triangular. Large species (13-29 mm.) . . . . . *rufomarginata* (Fabr.)
- Parameres hooked at apex but narrowing between hooked region and base and not becoming laminate. Produced plate of ventral part of pygophore elongate triangular, noticeably keeled. Smaller species (under 23 mm.) . . . . . 12
12. Parameres long with a prominent dorsolateral tubercle near the apex, ventral produced part of pygophore elongate . . . . . *marquesensis* Cheesman
- Parameres not as long and without a prominent tubercle, ventral produced part of pygophore not so elongate . . . . . *isolata* (Distant)

Key to Indo-Pacific species of *Leptocoris*—Females:—

1. Female genital capsule with upper pair of visible valves not produced as club like processes but represented by two thickish short plates with a few long hairs at apex, devoid of spines . . . . . *abdominalis* (Fabr.)

- Female genital capsule with upper pair of visible valves produced as club like processes (in some views of *L. mitellata* they may appear at first as elongate laminae), in all but one case (*rufomarginata* (Fabr.) ) bearing spines . . . . . 2
2. Club like upper valves devoid of spines, smallish and rounded with a long pilosity . . . . . *rufomarginata* (Fabr.)
- Club like upper valves generally larger, always with prominent spines . . . . . 3
3. Upper valves very convex, largish, spines fairly numerous, apparently in a single row or virtually so . . . . . 4
- Upper valves, generally flattened on the inner surface, not so in one species, but spines always scattered over the surface of the club, numerous or few . . . . . 5
4. Upper valves elongate claviform, often appearing laminate at first view, lateral valves small and fairly elongate . . . . . *mitellata* Bergroth
- Upper valves more freely clavate, lateral valves fairly massive . . . . . *coimbatorensis* sp. nov.
5. Upper valves large, not noticeably flattened on the inner surface, fairly circular in cross section, spines always numerous . . . . . *tagalica* (Burmeister)  
*isolata* (Distant)
- Upper valves generally not so large, noticeably flattened on the inner side, outer and terminal parts moderately convex giving a club shaped impression . . . . . 6



6. Upper valves with club shaped portion very small with only a few spines . . . . . *subrufescens* (Kirby)
- Upper valves with club shaped portion moderately large and with a moderate number of scattered spines . . . . . 7  
*augur* (Fabr.)  
*minuscule* Blöte  
*vicina* (Dallas)
7. Lateral valves prominent as two plates just beneath club shaped upper valves . . . . . *vicina* (Dallas)
- Lateral valves as two plates hardly visible beneath the club shaped upper valves . . . . . *augur* (Fabr.)  
*minuscule* Blöte

***Leptocoris augur* (Fabricius) 1781**

Fig. 1 A-C, 4 B

- Cimex augur* Fabricius, 1781: Spec. Ins., 2: 366. 1787: Mantissa Ins., 2: 301. Gmelin (in part) 1788: Syst. Nat., 1 (4): 2174. (Type in Bank's Collection in British Museum checked by Mr. R. J. Izzard.)
- Lygaeus augur* Fabricius (in part), 1794: Entom. Syst., 4: 161. 1803: Systema Rhyngot., 226.
- Leptocoris augur* Burmeister, 1835: Handbuch der Ent., 2: 305.
- Serinetha augur* Dallas, 1852: List Hem. Ins., 2: 460. Stål, 1868: Kongl. Svensk. vet. Akad. Handl., 7 (11): 68. 1873: *loc. cit.*, 11 (2): 99. Distant, 1902: Fauna Brit. Ind. Rhynch., 1: 420. Maxwell-Lefroy, 1909: Indian Insect Life, 684. Hoffinan, 1933: Lingnan Sci. J., 12 (1): 22 (biology), figs.
- Lygaeus chalconcephalus* Fabricius, 1803: Systema Rhyngot., 226 which has been placed in the synonymy of this species is based on a composite specimen from two species according to Stål 1868.
- Serinetha dallasi* Dohrn, 1860: Stett. ent. Ztg., 21: 42 (*typ. vid.*). Distant, 1902: Faun. Brit. Ind. Rhynch. 1: 420. (New synonymy.)
- Reddish or reddish ochraceous in the main; rarely pale eyelamen coloured or yellow. Pilosity black.

Antennae piceous, basal segment reddish brown at base, sometimes almost to apex. With a short but thickish black pilosity.

Head fairly broad, tylus somewhat longer than jugae. A tumescence behind and in front of eyes and apex of tylus with a few short black hairs. Head otherwise fairly glabrous, not punctate, a short longitudinal impressed line beginning just behind base of tylus and reaching back to about ocelli. Ocelli on small raised tumescences, a fraction nearer to base of eye than each other.

Rostrum brownish piceous, two basal segments the palest, reaching about middle of third true abdominal segment.

Pronotum with lateral margins straight and not laminate, anterior margin very slightly concave, posterior almost straight, slightly sinuate. With two obliquely directed flattish blackish depressed impunctate areas in the anterior third (calli) which extend from the mid line to the lateral margin. In front of their outer edges a tumescence in each of anterior lateral angles of the pronotum connected to the one on the other side by a raised triangular impunctate region, the apex directed posteriorad and the sides adjacent to the apex forming the anterior margins of the smooth depressed areas. Remainder of pronotum finely but densely punctate, hind margin depressed. A fairly prominent keel running from anterior depressed areas back. Pronotum in general pretty glabrous but lateral margins and anterior raised triangular area with a fairly sparse black pilosity.

Scutellum somewhat elevated with disc flat and a slight tendency for the lateral margins to be keeled. Depressed at apex and transversely just behind base of pronotum. Impunctate and only slightly pilose.

Corium and clavus finely but densely punctate with an extremely fine short and sparse pilosity, probably greyish. Membrane black tending brownish black broadly along the hind margin. One specimen, presumed to be from Ceylon, in the collection of the Institut zoologique de Warszawa has the membrane greatly reduced and the hemelytra just surpass the middle of the abdomen.

Legs (except basal part of trochanters and coxae which are concolorous with main body) piceous black with short black hairs.

Male genitalia as figured. Hind ventral margin of penultimate segment of capsule almost truncate, very pilose, extending only a little behind apex of anal segment. Male clasper fairly elaborate with a ventrally and exteriorly directed tooth on the outer ventral margin and about half way to apex and a concave area on ventral face near apex.

The clasper of *minuscule* Blöte is on the contrary fairly simple and without any prominent tooth.

Female genitalia as figured, they are not easy to distinguish from certain other species (*minuscule* Blöte, *vicina* (Dallas) ) except in that the clubs are not very convex and the inner margin is flat. These have numerous brown spines and a few long whitish hairs. Long whitish hairs also scattered elsewhere on the genital capsule.

Length: 11-16 mm. Width: 3.5-5 mm.

*Distribution.* In the British Museum and Rijksmuseum are specimens from Formosa, Tonkin, Laos, South India and Java. The species apparently is wide spread and abundant on the South East Asian mainland and penetrates into Indonesia.

*Loc.*

Formosa: Hans Sauter, acquired 1908 1♂ Cat. No. 3 and 1♀ Cat. No. 4 and both also labelled No. 58. The female has an additional pencil label with Takao 22 XI 07 (R.M.). Takao, No. 153, H. L. Parker collection, 1♂ (U.S.N.M.).

Tonkin: Hanoi, Feb. 1917, R. V. de Salvaza, 1♂ and 2♀♀. Guang Yen, 7 V 1916, R. V. de Salvaza, 1♂ and 1♀ (B.M.).

Laos: Ventiane, 22 X 1919, 1♂ and 20 III 1917 1♀, R. V. de Salvaza. Na Peng, 25 X 1919, R. V. de Salvaza, 1♂. Haut Mekong, Ban Quang, 24 IV 1918, R. V. de Salvaza, 1♀ (B.M.).

Siam: Nan, 20 XII 1927, T. D. A. Cockerell, 1♀. Nontebnri, 9 II 1923, Hugh Smith, 1♀ (U.S.N.M.).

North India: Punjab and United Provinces, VI-X (no year), R. L. Wogbun Coll., 1♂ and 1♀. Calcutta, No. 58, no collector or date, 1♂. Silhet, P. R. Uhler, 1♂ (U.S.N.M.).

Java: 1♀ simply labelled Java, Reinn and Cat. No. 2 (R.M.).

Indonesia: 1♂ labelled "Indes or INT H. de Saussure" and another "Indes or" with on back of label what looks like "Pnil, July" (U.S.N.M.).

#### ***Leptocoris minuscule* Blöte 1934**

Fig. 1 D-F, 4 C

*Leptocoris minuscule* Blöte, 1934: Zool. Meded., 17: 267, fig.

Reddish or reddish ochraceous. Pilosity black.

Antennae blackish brown, with a short but fairly dense blackish pilosity.

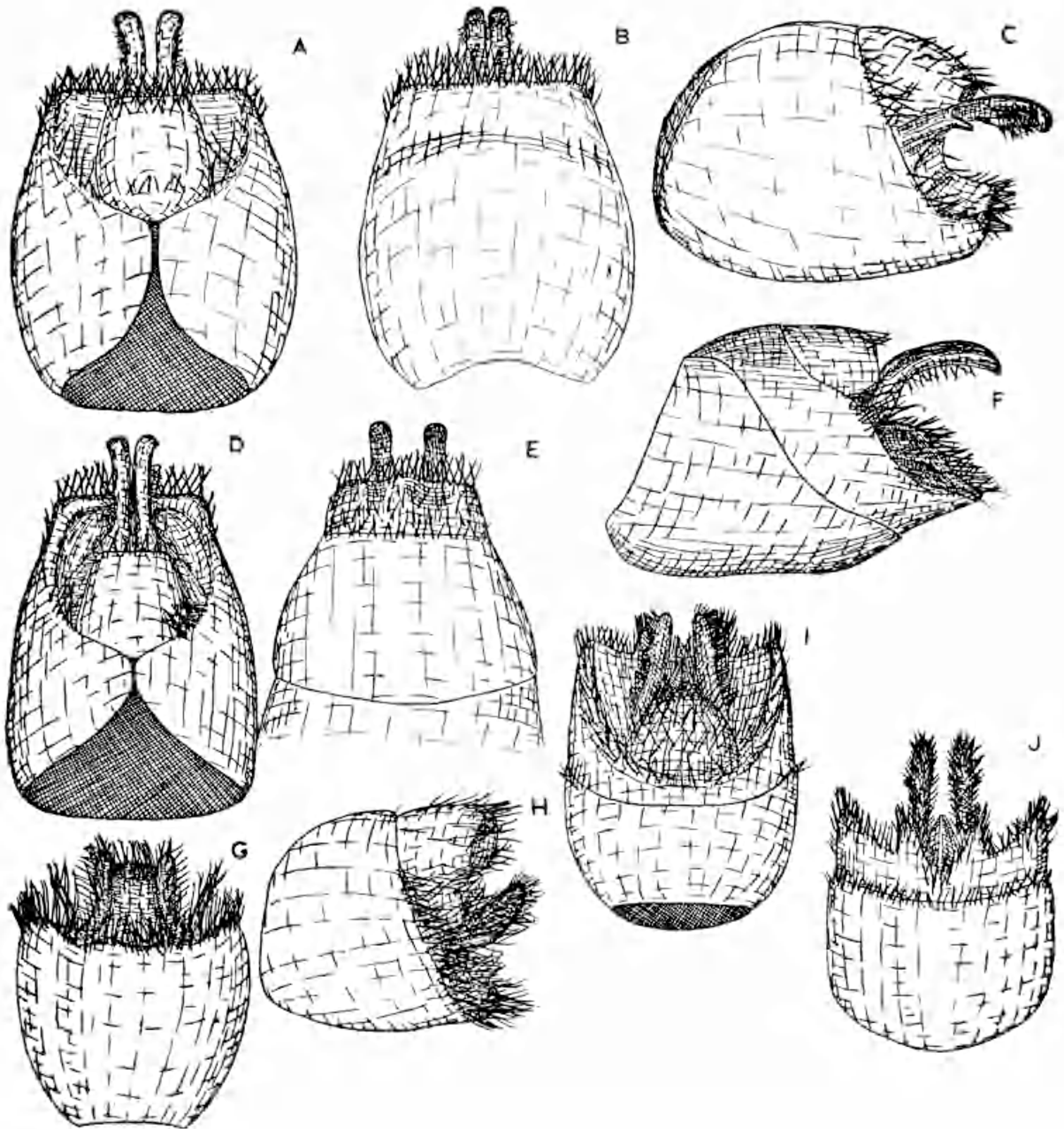


Fig. 1: A-C *Leptocoris augur* (Fab.), A—male genital capsule from above, B—same from below, C—same from left hand side. D-F *Leptocoris minuscula* Blöte, D—male genital capsule from above, E—same from below, F—same from left hand side. G-H *Leptocoris corniculata* (Stal), G—male genital capsule from above, H—same from left hand side. I-J *Leptocoris coimbatorensis* sp. nov., I—male genital capsule from above, J— same from below.

Head blackish brown, fairly broad. Tylus only slightly longer than jugae. A swollen tumescent area behind each eye (which in some specimens is paler), and a slightly swollen one in front of eyes and apex of tylus with a short pilosity. Head otherwise fairly smooth. Eyes and ocelli red. Rostrum reddish black, reaching second abdominal segment.

Pronotum shaped very much as in *augur* but the two anterior smooth areas (calli) are not so oblique, depressed or flat. There is no tumescence on the margin in front of smooth areas nor a raised anterior region of the pronotum in front of them. The calli are blackish. Hind two thirds of pronotum fairly closely and densely punctate.

Scutellum blackish, the two specimens I have seen do not give much idea of its form as the pins have been driven through at this point.

Hemelytra with corium and clavus reddish or reddish ochraceous, finely punctured, also wrinkled. Membrane brown. The male from Koepang has only a clavus left on the left side and corium and clavus on the right. The corium of this specimen is rounded at its apical angles and together with its rather square pronotum leads me to believe that this specimen was brachypterous. Brachyptery was up until now unknown as far as I can tell in *Leptocoris*, but in both this species and *augur* there is evidence of its occurrence.

Legs brownish black, coxae yellowish in their basal 2/3. Most of mesosternum and mesopleura (except the postero-lateral areas), a patch on the propleura above the coxal insertion and most of the visible metapleura brownish black.

Male genitalia as figured. Ventral apical margin of penultimate segment sinuate, vaguely three-lobed, very pilose. Claspers fairly thin, only slightly concave on their ventral surface.

Female genitalia as figured, very similar to *augur* in general appearance. The clubs are flat on their inner surface and not very concave on their outer surface. With rather fewer large spines than *augur*. Apparently closely related to *augur*.

Length: 9-12 mm.

*Loc.*

Timor: Macklot, Cat. No. 5. Paratype ♀ (R.M.). Koepang, 6-21 June 1929, I. M. Maekerras, one brachypterous ♂ (C.S.I.R.O.). The type series was from Macklot.

Dr. Blöte has kindly checked my genitalia drawings with his type series and confirmed the status of this species.

**Leptocoris corniculata** (Stål) 1866

Fig. 1 G, H, 3 D

*Serinetha corniculata* Stål, 1866: Berl. ent. Ztg. 10: 381. 1873: Kongl. svensk. Vetens.-Akad. Handl., 11 (2): 99. Distant, 1902: Faun. Brit. Ind. Rhynch., 1: 420. (*Typ. vid.*)

Reddish ochraceous with a fine whitish or yellowish pilosity.

Distal segments of antennae brownish black, base of second segment and whole of first segment reddish brown.

Head broad with a tumescence behind, and a short but prominent tubercle in front, of each eye. Eyes concolorous with rest of head, ocelli yellowish.

Depressed areas of pronotum vaguely oblique, fairly flat. Region of pronotum in front of these calli raised but somewhat declivous towards anterior margin. A strong keel runs back from between the calli to the hind margin which is depressed and broadly curved. Lateral margins behind calli curved laminate, the whole lateral margin gives the impression of being strongly notched in the region of the calli as the laminate lateral margins cease at this point and in front of the calli the collar is produced laterally as a little lobe on each side. In the type only the centre of the hind pronotal disc is flat, towards the lateral margins it is inclined upwards and the lateral margins behind the calli are actually the highest parts of the pronotum. The pronotum is coarsely punctate. Scutellum with sides vertical, upper surface flat. Hemelytra very finely punctate with a pale yellowish pubescence, membrane black.

Underside mostly yellowish ochraceous. Rostrum (except tip which is black) and legs including coxae reddish. Dorsal margins of abdominal segments and apical regions of seventh abdominal segment also red. An area above coxae on both meso- and metapleuron blackish and a faint one on propleuron tending fuscous. Each ventral segment laterally with a blackish area running from near dorsal margin almost to venter and from anterior margin almost to hind margin, the hind margin of each segment (except the seventh which is red) is therefore yellowish ochraceous and this ochraceous band is wider ventrally than dorsally.

The male genitalia of the unique type are as figured. The ventral surface of the pygophore is produced forward and the apical margin is sinuate with an obsolete lobe either side of the mid line. Laterally the margin of the pygophore is flattened and directed inwards, towards the clasper, alongside of which it gives off a thinnish but fairly long process, this process is hard to see amongst the pilosity, and due also to its proximity to the clasper. The claspers are laterally flattened and very pilose, their dorsal margin is straight but the ventral one tends to be convex. Anal tube elongate. The ventral and lateral margins of the pygophore, the external faces and the ventral margins of the claspers and the apical margin of the anal tube are very markedly pilose and this pilosity tends to conceal the structure of the base of the claspers and the margins of the pygophore.

The female genitalia are unknown.

Length: 14 mm.

*Loc.*

Western India. Düben. Reg. No. 364; 58.

Stål's Holotype Male (Naturhistoriska Riksmuseet, Stockholm).

***Leptocoris coimbatorensis* sp. nov.**

Fig. 1 L, J, 4 D

Reddish or reddish ochraceous. Pilosity black or white.

Antennae castaneous or black, basal segment reddish, sometimes with a little black on top. Segments with a very short pilosity.

Head moderately broad with a tumescence behind each eye and in front of eyes an oblique fold beginning near midline of head about as far back as line joining centres of eyes and proceeding forwards, outwards and downwards to insertion of antennae. This fold with a shallow sulcus in front of its anterior margin. In one specimen the head is suffused in front with black. Ocelli small but on obvious tumescences, much nearer eyes than each other.

Rostrum almost reaching fifth abdominal segment, mainly brown, last segment in the main almost black.

Pronotum very similar in shape to *augur* but with the lateral margins rolled like a selvage and anterior depressed smooth areas somewhat convex.

Sentellum with centre raised, flat, and somewhat infuscated; lateral margins tending to be slightly raised above this as low keels, reddish.

Corium and clavus as well as scutellum and hind part of pronotum covered with a very fine pilosity. Corium and clavus very finely punctate in some specimens with smallish yellow patches. Membrane brownish black.

Underside with a fine white pilosity, an area of black on each of the pleurae above the insertion of the coxae, largest on the metapleurae. Legs brownish, coxae red.

Male genital capsule as figured. Very distinctive. Ventral apical margin of penultimate segment of capsule very pilose, thrown into four short lobes, extending well behind apex of anal segment, concave on its upper surface beneath the claspers. Claspers fairly broad with flattened faces and set at an angle to one another. Ventral face with a very dense pilosity giving the clasper somewhat of the aspect of a toothbrush. A blunt tooth along the external (and due to the inclination) dorsal margin about two-thirds of the way to apex.

Female genital capsule as figured. Upper valvulae very club-shaped, not elongate with at most two rows of spines running from near base to past apex. About 12 spines all told on each valvula and of course the usual long hairs. Lateral valvulae fairly massive and conspicuous.

Length: 10-15 mm.

*Loc.*

South India: Bolampatti Valley, Coimbatore District 20 IV 37, B.M.-C.M. Expdn. to South India IV-V 1937. Reg. No. B.M. 1947-469. Holotype ♂, allotype ♀, paratype ♂ and two paratype ♀♀ in the collection of the British Museum (Nat. Hist.).

### ***Leptocoris mitellata* Bergroth 1916**

Fig. 2 A-C, 4 E

Plate XLVIII

*Leptocoris mitellatus* Bergroth, 1916: Proc. Roy. Soc. Victoria 29: 31.

Woodward, 1951: Trans. Roy. Soc. N.Z., 79 (2): 207.

*Leptocoris (Serinetha)* sp. Evans, 1928: Ann. Mag. Nat. Hist., 10 (2): 463.

Ranging in colour from a purplish red to brick red. Long pilosity black, short pilosity whitish.

Antennae piceous with a moderately close black pilosity shorter than width of segment.



Head broad with a tumescence behind eyes and an oblique ridge in front of eyes running down to insertion of antennae very much like *coimbatorensis*. Tylus and a quadrate patch on vertex with its apex at base of tylus and running back to base of head with the ocelli placed on its lateral margins black or brownish black. Sometimes also jugae and tumescences behind eyes infuscated. Head with a few sparse black hairs which are more numerous on the calli behind the eyes, the oblique ridges in front of them and the tylus and jugae.

Rostrum black, reaching to base of second or third abdominal segment.

Pronotum very finely punctate in the posterior two thirds, with two oblique smooth and slightly oblique blackish or purplish calli in the anterior third which are separated from the anterior margin by a slightly raised triangular smooth area. This anterior smooth area and the lateral margins with moderately dense stiff black hairs. Hind margin of pronotum depressed and with a fine whitish pilosity: the disc with a median keel beginning between the calli and evanescent towards middle on base.

Scutellum raised, flat on top, blackish or purplish, with a fine whitish pilosity.

Corium and clavus very finely punctate, in the purplish red specimens there is usually a small quadrate bright red spot at the inner apical angle of the corium, also the humeral angles of the corium are somewhat reddish and this extends a little along the lateral margin. These two red areas are sometimes not obvious even in purplish red specimens and especially so in brick red ones. Membrane black, apically brownish.

Underside with black or purplish patches on anterior parts of pleurae and sometimes lateral (and sometimes also ventral parts of 4, 5 and 6 ventral segments) of 2-6 segments blackish or purplish.

Male genital capsule as figured, pygophore thrown into two lateral lobes (parandria) which are conspicuously notched at apex, almost bifid. Claspers massive, elaborately constructed, with tips turned downwards. Anal segment flattened dorsally. Ventral part of penultimate segment blackish.

Female genital capsule as figured, upper valvulae produced into two elongate clubs which are not as convex on the ventral surface as in some species and are flat on the inner posterior surfaces. These clubs with for the most part a single row of spines running from about one

third of their length from base to apex, changing direction at apex and possibly becoming two rows. Lateral valvulae small but easily distinguishable. Ventral valvulae not distinct.

Bergroth's type cannot be traced but there is no doubt on the identity of the species.

Length: 11-16 mm.

*Loc.*

This is apparently the commonest of the Australian species and is the only species in Southern Australia. It appears to occur almost always south of the tropic of Capricorn and is apparently absent from Tasmania. It is very abundant in the drier centre of the continent.

*Loc.*

Western Australia: 77 miles east of Balladonia, June 1914—696, 1♂, 1♀ (W.A.M.)

Northern and Arid South Australia: 407 miles west on Transcontinental Railway 4 X 20 coll. Troughton & Wright, 2♂♂, 2♀♀, Reg. No. K45478 (A.M.); Ooldea, VII 21 coll. J. A. Kershaw 1♀ (N.M.); Ooldea, T. D. Campbell, 1♂: Ooldea, no other data, 1♂: Barton, A. M. Lea, 1♂, 1♀: 20 miles west of Kychering Soak, Transcontinental Railway S. to W.A., 11-08, M. Chandler 26 V 04, 2♂♂, 1♀ (N.M.): Kingoonya, Coll. R. Harvey, 1♀: dead on salt, south-west gulf of Lake Gairdner, 18 III 50, coll. G. F. Gross & F. J. Mitchell, 1♂, Reg. No. E.S.I. 363: Mullaroo Peninsula, Lake Gairdner, 17-19 III 1950, G. F. Gross 1♂, 1♀: Bookaloo Siding, 19 VIII 1948, coll. G. F. Gross, 2♂♂, 1♀: Whittata Stn. Andamooka Rgs., 19 August 1948, 2♀♀, and 21 August 1948, coll. G. F. Gross 3♂♂, 2♀♀: Wongamoodla Ck., Andamooka Rgs., 26 VIII 1948, coll. G. F. Gross, 2♂♂, 4♀♀, and many nymphs: Birthday Well, Cariewerloo Stn., 9-12 III 1950, coll. G. F. Gross, 2♂♂, 2♀♀; near Frazers Hut, Cariewerloo Station, III 1950, coll. G. F. Gross (all S.A.M.); Iron Baron, 4 IV 48, coll. D. S., 2♂♂ and 4♀♀ (N.M.): Whyalla, XI 1952, coll. Hans Mincham, 1♀; Hammond, X 1950, H. V. Mincham, 1♂, 1♀ (A.M.); Mern Merna, Flinders Rgs., 15 II 1949, coll. G. F. Gross, 2♂♂, feeding on Bullock Bush (*Heterodendron olaciformum*) in large numbers, 8-15 II 1949, coll. G. F. Gross, 5♂♂, 6♀♀: Wilpena Pound, N. Flinders Rgs., 27 X 1955, coll. E. T. Giles, 1♀: Well 4 miles east of Oraparinna Stn., Flinders Rgs., 12 II 1956, at light, coll. G. F. Gross, 1♂, 1♀; Wirrealpa Stn., N. Flinders Rgs., 28 X 1955, at light, coll. E. T. Giles, 1♀: Italowie Gorge, N. Flinders Rgs., 30 X 1950, coll. E. T. Giles, 2♂♂, 2♀♀: Owieandana, N. Flinders Rgs., coll. H. M. Hale & N. B. Tindale, 1♀: Arcoona Spring

(now Aroona Reservoir) nr. Copley, 30 XI 1951, coll. G. F. Gross, 1 ♀ : Mt. Painter, N. Flinders Rgs., coll. H. G. Stokes, 1 ♂, 1 ♀ : Flinders Rgs., 26 V 47, no collector, 5 ♂♂, 2 ♀♀ : Lake Frome 30 VIII 1952, coll. K. Peake Jones and Party, Reg. No. E.S.I. 169 (S.A.M.) ; Mt. Lyndhurst, 20 miles east of Farina, coll. E. Troughton, 3 ♂♂, 3 ♀♀, Reg. Nos. K42721 & K42731 : Berri, damaging garden figs, 28 III 1939 (A.M.). Between Renmark and Mildura, on "bullock bush" (*Heterodendron olaciformum*) 10 V 1959, M. Kenny, 1 ♂ and a series of nymphs (S.A.M.).

Southern and Temperate South Australia: Karkoo near Pt Lincoln, coll. D. Kimber, 1 ♀ : Bundaleer Forest, Southern Flinders Ranges, 9 I 1927, 1 ♂ : "Kurlge" Blackwood, 850ft. at mercury vapor light, coll. N. B. Tindale, 19 X 1955 and 70°F., 1 ♂, 1 XI 1957 and 75°F., 1 ♀, 14 XI 1957 and 74°F., 1 ♀, and 23 XI 1957 and 77°F., 1 ♂ : Mt. Gambier, VII, coll. J. W. Rose, 1 ♀ and 3 nymphs : Kangaroo Island, coll. S. H. Shandon, 1 ♂ (S.A.M.) ; Clarendon, 27 X 1946, coll. H. M. Cane, 1 ♀ (C.S.I.R.O.).

Northern Territory: Hermannsburg, 7 ♂♂, 3 ♀♀ : Jay Creek, VI 1938, coll. C. Barrett : Finke R., coll. J. W. Rose (S.A.M.). Bergroth's types were from near Glen Helen, Macdonnell Rg. and Illamurta, James Range.

Victoria: North Victoria, XI 1942, coll. B. Pescott, 1 ♂, 3 ♀♀ (A.M.) ; Murray River, coll. J. E. Dixon, presented Jan. 1940, 2 ♂♂, 3 ♀♀ : Mallee, Murray River, IV 1919, coll. J. E. Dixon, presented I 1940, 1 ♂, 1 ♀ : Murray River, coll. C. French, presented 15 XI 1911, 2 ♀♀ : Murrabit, 31 III 1947, No. A3, 1 ♂, 1 ♀ : Kerang, 21 IV 1946, coll. R. E. T. 4 ♂♂, 3 ♀♀, and 11 V 1946, 2 ♂♂, and 30 VI 1946, 8 ♂♂ and 24 XI 1946, 1 ♂ ; Echuca, 25 IV 1955, coll. E. M., 10 ♂, 2 ♀♀ : Mallee District, coll. J. E. Dixon, presented 3 III 1914, 1 ♀ : Lake Hattah, coll. J. E. Dixon, presented I 1940, 3 ♂♂, 3 ♀♀ : Hattah, III 1914, coll. J. E. Dixon, 1 ♂ : Lake Hattah, 2 XI 1915, coll. J. E. Dixon, 2 ♂♂, and 1918 2 ♀♀ : Hattah, no other data, 2 ♀♀ : Ouyen, 29 XI 1916, coll. J. E. Dixon, 3 ♂♂, 2 ♀♀ : Sea Lake, IV 1916, coll. D. Goudie, 1 ♀ ; Inglewood, no other data, 2 ♀♀ : Gypsum, N. W. Vict., XI 1926, coll. J. E. Dixon, presented I 1940, 2 ♂♂, 1 ♀ : Kiata, X 1928 coll. F. E. Wilson, 2 ♀♀ (N.M.) ; Yackarandah, coll. W. D. Davey, 1 ♂ (S.A.M.).

New South Wales: Florida North, Moree, 4 I 1938, coll. Miss G. Grace, Reg. No. K66769, 2 ♂♂ : Watercourse at Moree, XI 1933, coll. A. Musgrave, 1 ♀ (A.M.) ; Moree, 1919, coll. W. W. Froggatt 1 ♂ and 1 ♀ and 1920 1 ♀ : Therribri, XI 1932, coll. Mackerras, 1 ♂, 3 ♀♀ ; Goan Water Hole, 4 V 1950, coll. K. Key, 1 ♂ : New England National Park,

19 III 1954, coll. E. F. Riek 1 ♂, 4 ♀ ♀ (C.S.I.R.O.); Mullaley, XI 1957, coll. F. E. Wilson, 1 ♀ (S.A.M.); Curlewis, 29 X 1933, coll. A. Musgrave & T. Iredale 1 ♂; Coonamble, XI 1906, coll. W. W. Froggatt, 1 ♂, 2 ♀ ♀; Trangie, 2 V 1950, coll. P. C. Minter, 1 ♂, 1 ♀: 9 miles on the Dandaloo Road from Trangie, 25 VIII 1950, coll. L. Chinnick and B. Cameron, 2 ♂ ♂, 1 ♀; Trangie, 23 XI 51, coll. B. Cameron, 1 ♂, 3 ♀ ♀ (C.S.I.R.O.); Bogan River, coll. J. W. Armstrong, Reg. No. K64293, 2 ♂ ♂, 1 ♀; Tennamungamie via Dubbo, 4 IX 1947, coll. Mrs. G. Bakewell, 5 ♀ ♀; Dubbo, XI 1928, coll. A. J. Barrett, Reg. No. K5864, 1 ♂ (A.M.); Newcastle, 3 IV 1946, No. R. 3, 1 ♀ (N.M.); Marsden, I 1940, coll. Mrs. R. B. Sanderson, 1 ♂, 3 ♀ ♀ (C.S.I.R.O.); Lannigan's Creek, Geelong Caves District, near Yerranderie, 18 VII 1927, coll. T. G. Campbell, Reg. No. 56574, 1 ♀ and 10 XI 1927, coll. A. Musgrave and T. G. Campbell, Reg. No. K56908, 1 ♀; Savernake, 24 XI 1948, 1 ♂, 1 ♀; Lookout Tank near Broken Hill, 6 IV 1942, coll. Chadwick, 1 ♂ (A.M.); Red Gum, Deniliquin, 1926, 1 ♀ (C.S.I.R.O.).

Queensland: Clermont XI 1929, coll. Dr. K. K. Spence, Reg. No. K62359, 1 ♂ (A.M.); Biloela, 5 XII 1926, coll. E. Bollard, 1 ♂ (U.Q.); Eidsvold, V 1929-IV 1930, coll. T. L. Bancroft, 1 ♂ (C.S.I.R.O.); Morven District, IV 1941, coll. N. Geary, 2 ♂ ♂, 1 ♀; Bunya Mts., 18 XII 1937; 3000', coll. N. Geary, 1 ♂, 1 ♀ and 22 I 1938, 2000', 1 ♂; Cunnamulla, X 1944, N. Geary, 1 ♀ (A.M.); Brisbane, 28 VIII, 1911, coll. H. Hacker, 1 ♀; Beaudesert, 30 V 1942, coll. F. W. Withbraham, 1 ♂, 2 ♀ ♀; Plateau, Killarney, 14 XI 1932, coll. H. Hacker, 1 ♀; Killarney, 1 XI 1932, coll. H. Hacker, 1 ♂ (U.Q.); Stanthorpe, no other data, 1 ♀; Lawes, 13 III 1952, coll. G. Saunders, 1 ♀, (S.A.M.).

Australia: Unlocalized, but presumed from Queensland, Koebele, no other data, abdomen missing (U.S.N.M.).

New Zealand: A single *Leptocoris* specimen has been recorded from New Zealand and is mentioned in Evans 1928. If the identification and locality were correct it could well be this species, or perhaps *tagalica* Burmeister which occurs also in Samoa.

### ***Leptocoris vicina* (Dallas) 1852**

Fig. 2 D, E, 4 F

*Serinetha vicina* Dallas, 1852: List. Hem. Ins., 2: 460. Distant, 1902: Fauna Brit. Ind. Rhynch., 1: 420 (exclude reference to *coxalis*). (Type in British Museum checked by Mr. R. J. Izzard.)

*Astacops nigricornis* Walker, 1872: Cat. Het. 5: 36. (Type in British Museum check by Mr. R. J. Izzard.) New synonymy.

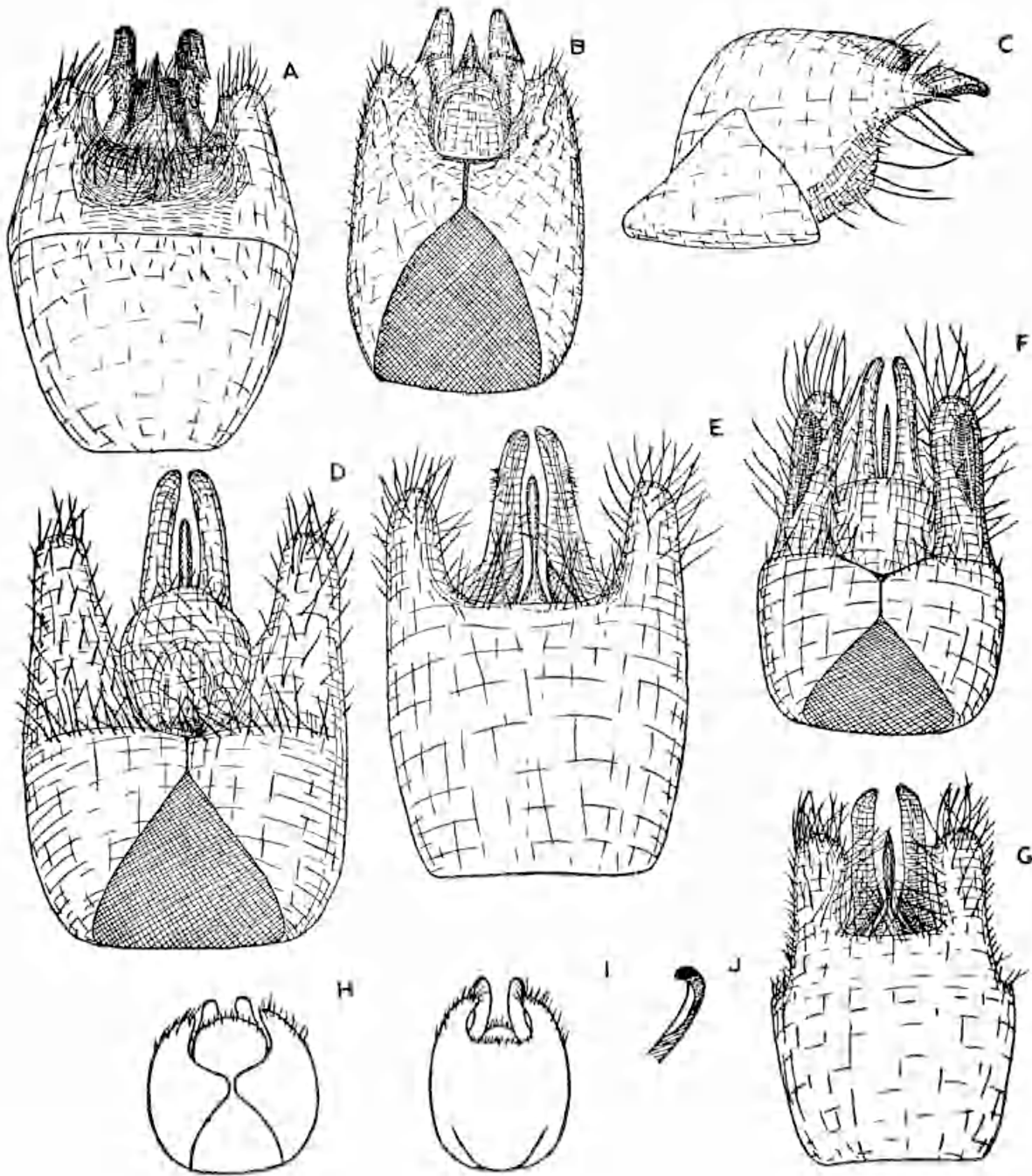


Fig. 2: A-C *Leptocoris mitellata* Bergroth, A—male genital capsule from above, B—same from below, C—same from left hand side. D-E *Leptocoris vicina* (Dallas), D—male genital capsule from above, E—same from below. F-G *Leptocoris subrufescens* (Kirby), F—male genital capsule from above, G—same from below. H-J *Leptocoris coxalis* (Kirby) (drawn from the type male in the British Museum by Mr. R. J. Izzard and not to same scale as remainder), H—male genital capsule from above, I—same from below, J—paramere in dorso-lateral view.

*Serinetha longirostris* Dallas, 1852: List. Hem. Ins., 2: 461. (From the sketch of the female genitalia supplied by Mr. Izzard this species is probably a synonym of *vicina*.) New synonymy.

*Leptocoris nigricornis* Blöte, 1934: Zool. Meded., 17: 269.

*Leptocoris carnivorus* Usinger, 1946: B. P. Bishop Mus. Bull., 189: 25, fig. (*Paratyp. vid.*) New synonymy.

There is just a slight doubt that *vicina* is actually the final name for this species. *L. vicina* was described from the Philippines as was *tagalica* Burmeister. If the type of this latter species is ever found it could possibly turn out to be this species, not the species which I believe is *tagalica*. (See discussion under *tagalica*.)

Purplish or yellowish red. Long pilosity black, fine pubescence greyish.

Antenna black or purplish red, with short stiff dense black hairs. Head moderately broad with a tumescence behind the eyes and an oblique ridge running down in front of the eyes like *coimbatorensis*. Eyes a darker red than rest of head. Head with sparse stiff hairs more concentrated on the tumescence behind the eyes and the tylus and jugae.

Rostrum reaching to apex of second abdominal segment, black or blackish brown.

Pronotum very similar in shape and structure to *augur*, but the depressed anterior smooth areas (calli) are slightly convex, purplish. Pronotum in some specimens infuscated posteriad.

Scutellum very similar in structure to *augur*, flat on top.

Corium and clavus very finely punctate with a fine greyish pubescence. In some specimens the clavus and the inner half of the corium is infuscated. Membrane blackish brown.

Propleurae above coxae and most of mesosternum, mesopleura, metasternum, and metapleurae and the ventral part of all abdominal segments I-V generally blackish. Legs blackish brown.

Male genital capsule as figured, pygophore thrown into two lobes (parandria) which are round in cross section and with a long yellow pilosity. Claspers fairly simple, curved downwards at apex and feebly concave on the underside in the terminal half. In the basal half the under surface changes inclination by 45° and becomes broader and less concave. Ventrally the pygophore is produced posterioriad between the claspers as a narrow lamina (hypandrium?) with its broad face in the perpendicular plane.

Female genital capsule as figured, not easily distinguished from those of *augur* and *minuscula* on first sight. Upper valvulae produced as two clublike processes which are flat on their inner surfaces and with numerous fairly long scattered spines on their outer surfaces and a few long hairs. Lateral valvulae visible as two plates under the upper valvulae and with a few long hairs at their apex. Ventral valvulae somewhat convex.

Length: 12-15 mm.

*Loc.*

Indonesia: Java: Semirang, coll. E. Jacobson, 1 ♀, Cat. No. 2: Java, no other data, 1 ♂, Cat. No. 7 (R.M.). Coral Island, Djakarta Bay, 15 V 1929, coll. I. M. Mackerras, 1 ♂ (C.S.I.R.O.).

Soembawa: Coll. v. Lansberge, no other data, 1 ♂, Cat. No. 1 (R.M.).

Wetter: coll. C. Schädler, acquired 1898, 1 ♀, Cat. No. 2 (R.M.).

Philippines: Luzon: Mt. Banahao, coll. P. I. Baker, 1 ♂ (U.S.N.M.); Mt. Banahao, 2000' North Luzon, coll. G. Böttcher, 1 ♀: Bataan Province, coll. G. Böttcher, 1 ♂, 1 ♀ (B.M.); Mt. Makiling, coll. Baker, 1 ♂, 2 ♀ ♀; Los Banos, coll. P. I. Baker, 1 ♂, 1 ♀ (U.S.N.M.).

Mindanao: Port Banga, South Mindanao, coll. G. Böttcher, 1 ♀ (B.M.).

Micronesia: Marianas: Saipan: Afenia-Charanka, 4 VII 1939, coll. Teiso Esaki, 1 ♀ (K.U.).

Rota: VI 1952, coll. Y. Kondo, 1 ♂, 3 nymphs (B.P.B.M.).

Guam: Cetti Bay, 28 V 1936, coll. R. L. Usinger, 1 ♂, 1 ♀ (Paratypes of *L. carnivorus* Usinger) (B.P.B.M.); Inarajan, 28 IX 1938, No. 1240, on *Ficus* sp. and *Colubrina asiatica*, coll. K. G. Oakley, 6 ♂ ♂, 1 ♀. No precise locality or date, No. 1187, coll. D. T. Fullaway, 1 ♀ (U.S.N.M.). Ritidian Point, 2 VI 1936, coll. Swezey, 1 ♂ (Paratype of *L. carnivorus* Usinger); Ritidian Point, 29 V 1945, by beating vegetation, coll. H. S. Dybas, lot 2082, 3 ♂ ♂, 3 ♀ ♀ (C.N.H.M.). Ritidian Point, 30 V 1945, coll. G. E. Bohart & J. L. Gressitt, 1 ♂, 1 ♀: VI 1945, coll. J. L. Gressitt, 4 ♂ ♂, 6 ♀ ♀. Ditto, on beach, 6 VI 1945, coll. G. E. Bohart & J. L. Gressitt, 2 ♀ ♀. Ditto, 1 VIII 1945, coll. J. L. Gressitt, 1 ♂. Point Oca, VI 1945, coll. J. L. Gressitt & G. E. Bohart, 6 ♂ ♂, 3 ♀ ♀. One mile S.E. of Asan, 4 XI 1947 and 30 X 1949 altitude 600-800 feet, coll. H. S. Dybas, 2 ♀ ♀ (B.P.B.M.).

Western Carolines: Palau Islands: Ngariungs Islet, Ngaiangl (Kayangel) Atoll, 16 XII 1952, No. 5622, coll. J. W. Beardsley, ex

fern, 1 ♂, 5 ♀ ♀. Same locality and date, coll. J. L. Gressitt, 1 ♂. Koror Island, limestone ridge S. of Inlet, 22 I 1948 coll. H. S. Dybas, 1 ♂. Koror Island, IV 1954, coll. J. W. Beardsley, 1 ♀, Peleliu Island, Mt. Amiangal, 23 XII 1952, coll. J. L. Gressitt, 2 ♂ ♂, 3 ♀ ♀. Peleliu Island, East Coast, 31 VII 1945, coll. H. S. Dybas, one male with mutated genital capsule (B.P.B.M.).

Pulo Anna Island: 13 IX 1952, coll. N. Krauss, 1 ♂, 1 ♀, 1 nymph (B.P.B.M.).

Yap Islands: Mt. Metade near Yaptown, 12 VII 1946. No. 1087, coll. H. K. Townes, 1 ♀. Rungung Island, 19 VI 1957, coll. C. W. Sabrosky, 3 ♂ ♂ (B.P.B.M.).

Ulithi Atoll: Falalop Islet, 4 X 1952 and 1 X 1952, coll. N. L. H. Krauss, 2 ♀ ♀ (B.P.B.M.).

Woleai Atoll: Falalis Islet, 20 IX 1952, coll. N. H. L. Krauss, 2 ♂ ♂ (B.P.B.M.).

### ***Leptocoris subrufescens* (Kirby) 1888**

Fig. 2 F, G, 4 G

*Lygaeus subrufescens* Kirby, 1888: Proc. Zool. Soc. Lond., 553, 1900:

Monogr. Christmas Island, 128. Plate 15, fig. 3. (Type in British Museum checked by Mr. R. J. Izzard.)

Shining brown, with a pale brown pilosity. Antennae concolorous with rest of body. Head not very broad, structure very similar to *vicina*. Eyes and ocelli red. Rostrum reaching to about middle of fourth abdominal segment.

Pronotum shaped very much as in the preceding species. Punctuation of the portion behind the smooth areas more obvious. Scutellum also shaped as in *vicina*. Corium and clavus more conspicuously punctured than in the other species. Membrane the same brown colour as the rest of the body.

Beneath the body is a pale brownish yellow with perhaps some darkenings on the pleurae above the coxae. Legs brown.

Male genital capsule as figured, very similar in outline and also the shape of the claspers to the preceding but the prominent lateral lobes (parandria) of the pygophore are conspicuously grooved on their upper surfaces for a good part of their length.



Female genitalia as figured. The upper valvulae are produced as clubshaped processes which are flat on their inner side. They are however smaller than in *vicina* and with a lot fewer spines, apparently not more than 10. The lateral valvulae are apparent as plates beneath the upper valvulae with a few terminal hairs. Ventral valves fairly convex.

Length: 11-14 mm.

*Loc.*

Christmas Island, Indian Ocean, 1 IV 1933, 1 ♂, 1 ♀ (B.M.).

### ***Leptocoris coxalis* (Kirby) 1891**

Fig. 2 H-J

*Serinetha coxalis* Kirby, 1891: Journ. Linn. Soc. Lond., Zool., 24: 93.

*Serinetha vicina* Distant (in part) 1902: Fanna Brit. Ind. Rhynch., 1: 420.

This species is only represented by the unique male type in the British Museum, figures of whose genitalia have been done for me by Mr. Izzard and comprise fig. 2 H-J of this work.

The species is evidently distinct from *vicina* although it belongs to the *vicina* group.

Kirby describes the species as "Red; antennae, except at extreme base beneath, scutellum, membrane, legs except the coxae, pectus, and ventral surface of abdomen except at the sides and extremity black.

Easily recognizable by the conspicuous red coxae on a black background."

Length: 14 mm.

*Loc.*

Ceylon.

### ***Leptocoris abdominalis* (Fabricius) 1803**

Fig. 3 A-C, 4 H

*Lygaeus augur* (in part) Fabricius, 1794: Ent. Syst., 4: 161, 88.

*Lygaeus abdominalis* Fabricius, 1803: Syst. Rhyng., 226. (Type checked in Copenhagen by Dr. A. Nielsen against sketches of genitalia.)

- Leptocoris abdominalis* Burmeister, 1835: Handbuch der Ent., 2: 305. Blöte 1934: Zool. Meded., 17: 266.
- Lygaeomorphus abdominalis* Blanchard, 1840: Histoire nat. des Insectes 3: 116.
- Pyrrhotes abdominalis* Westwood, 1842: Cat. Hem. Coll. Rev. Hope, etc., 2: 26.
- Serinetha abdominalis* Dallas, 1892: List Hem. Ins., 2: 460. Stål 1868: Kongl. svensk, Vetens.-Akad. Handl., 7 (11): 68. 1873: *Loc. cit.* 11 (2): 99. Tryon, 1892: Ann. Qld. Mus., 2: 22. Lethierry & Severin, 1894: Cat. gén. Hém., 2: 122. Distant, 1901: Ann. Mag. nat. Hist. 7 (7): 428. 1902: Faun. Brit. Ind. Rhynch., 1: 419, fig.
- ?*Leptocoris rufus* Hahn, 1831: Wanz. Ins., 1: 201, f. 102. (The type of this species cannot be located and its position here is only conjectured, and traditional.)
- Serinetha taprobanensis* Dallas, 1852: List. Hem. Ins., 2: 461. (Type presumed lost.) New synonymy.
- Leptocoris bahram* Kirkaldy, 1899, Bull. Liverpool Mus., 2: 46. (Type in British Museum checked by Mr. R. J. Izzard.) New synonymy.
- Leptocoris marginata* Blöte, 1934: Zool., 17: 267, fig. (Type checked in Leiden against sketches of genitalia.) New synonymy.

Excepting the original references of Fabricius, and the references to *taprobanensis*, *bahram* and *marginata*, practically all of the other references probably refer also in part to the next species *rufomarginata* (Fabr.). Most series I examined labelled either *abdominalis* or *rufomarginata* were a mixture of both species.

Both are very variable species and *abdominalis* can be separated at the moment into at least three subspecies on colour and colour pattern and the development of the keel on the disc of the pronotum and also on the convexity of the pronotal disc. These are:—

#### ***Leptocoris abdominalis taprobanensis* (Dallas) 1852**

Is the extreme western variant of the species, occurring on the Islands of Ceylon and Socotra. Distant 1902 p. 419 also mentions the "pale form *taprobanensis* Dall.—is not infrequent at Calcutta." The general colour is a bright honey yellow, the eyes and ocelli are red and the antennae, rostrum, all thoracic sterna and pleurae (except the dorsal margins broadly of the pleurae, especially of the first and the hind margin of the metapleura narrowly, which are yellow) and all the

ventral abdominal segments (except for a broad stripe along their dorsal margins and except the last and those of the genital capsule which are yellow) and membrane black. Pronotal keel fine. This subspecies is fairly broad in relation to its length. Although Dallas' type cannot now be found in the British Museum, there is no doubt it was this form he had for it is common in all collections from Ceylon which I looked over.

***Leptocoris abdominalis abdominalis* (Fabr.) 1803**

Is the central variant and the type race of the species occurring in Indonesia and the Philippines. The general colour is a dark brick red but the distribution of red and black is the same as for the previous subspecies. The disc of the pronotum just behind the impressed smooth area tends to be rather more convex than in either of the other two subspecies and in one specimen (paratype of *marginata* Blöte) I have seen it is conspicuously so. The pronotal keel is almost obsolete, and the subspecies is fairly broad in relation to its length.

***Leptocoris abdominalis blötei* subsp. nov.**

Is the eastern variant of the species and confined so far as I know to New Guinea. The general colour is a honey yellow, the head tending to be a little suffused with red or blackish brown. Eyes and ocelli red. The distribution of yellow and black beneath is exactly as for the subspecies *taprobanensis* and the membrane is black with a greyish tinge, but above the pronotum has a large semicircular black patch with its diameter on the hind margin of pronotum and occupying three-quarters of this hind margin. This spot extends forward to at least half way to apex of pronotum. The pronotal keel and impressed smooth areas are also black and in one specimen most of the collar in front of these, as is the scutellum, clavus and all the corium except for a broad longitudinal stripe along the whole length of the outer margin which is yellow. The pronotal keel is more distinct, possibly because it is outlined with black in the region of the pronotum anterior to the large black posterior spot. This subspecies is also conspicuously more elongate in relation to its width than the other two subspecies.

The description of the species with allowances for the subspecific variations is as follows.

General colour dark brick red (subsp. *abdominalis*) or honey yellow (subsp. *taprobanensis* and *blötei*). Pilosity on antennae black, long pilosity on body greyish, short pilosity golden.

Antennae black, with a fairly thick short pilosity, Head broad, with two obliquely placed sulci running from just in front of insertion of antennae to join in middle of vertex at about level of middle of eye thence continuing to base of head as a single longitudinal sulcus, the three sulci in the form of a **Y**. Head dark brick red (subsp. *abdominalis*), honey yellow (subsp. *taprobanensis*) or honey yellow suffused with red or brown (subsp. *blötei*). Eyes and ocelli always red. Rostrum black.

Pronotum with the two somewhat depressed narrow smooth areas running from centre line to lateral margin and somewhat obliquely placed, yellow or yellowish brown in the subspecies *taprobanensis*, red in *abdominalis* and black or piceous in the subspecies *blötei*. The narrow collar of the pronotum in front of these depressed smooth areas very raised and more annulus shaped than in most other species. In the subspecies *blötei* often suffused with black. Lateral margins of pronotum behind the depressed smooth areas fairly rounded, not nearly as straight as in the eight preceding species although in the subspecies *blötei* they are not as rounded as in the other two subspecies. Hind margin sinuate. Disc of hind portion of pronotum coarsely punctate and often convex or tumescent near the centre in the subspecies *abdominalis*, more finely punctate in the other two. Hind part of pronotum brick red in *abdominalis* golden yellow in *taprobanensis* and golden yellow with a large semi-circular black spot with its diameter about three quarters of the hind margin and extending forward to at least middle of the pronotum. Keel from where it emerges from this large spot on the pronotum to where it terminates at the impressed areas black in *blötei*.

Scutellum slightly raised flat on top, yellow in *taprobanensis*, brick red in *abdominalis* and black in *blötei*. Impunctate smooth.

Corium and clavus very finely and fairly sparsely punctate, honey yellow in *taprobanensis*, brick red in *abdominalis* and black, except for an outer margin of the corium which is broadly yellow in *blötei*. Membrane black, or with a greyish or metallic greenish tinge in the case of *blötei*.

Hind part of pronotum, scutellum and coriaceous part of hemelytra covered by a fine golden pubescence.

Underside largely black or blackish brown. Underside of head, dorsal margin of propleura broadly, and dorsal margin of meso-pleura and upper half of posterior margin of metapleura narrowly yellow in *taprobanensis* and *blötei*, red or reddish brown in *abdominalis*. Genital

capsule, last visible ventral segment and a broad longitudinal streak running along the dorsal parts of abdominal segments 1-5 yellow suffused with sanguineous in *taprobanensis*, yellowish brown in *blötei* and reddish brown in *abdominalis*.

Male genital capsule as figured. Penultimate segment thrown into short lobes which are circular in cross section, convergent, and very strongly pilose. Claspers as figured, in the form of a longitudinal segment of a hollow cylinder basally, becoming a cylindrical and somewhat sinuate process apically.

Female genital capsule as figured. Upper valves unlike all other species are not in the form of clubs but are small plates beneath the anal segment and with a few long terminal hairs. Lateral valves visible, a similarly shaped set of plates below these again, and ventral valves fairly convex.

Length: 14-21 mm.

*Loc.*

Ceylon (subsp. *taprobanensis*): 3 V 93, coll. Sir G. T. Smith, 2 ♀♀: Colombo, I 1915, coll. I. Mc Ech'n, 1 ♀ (S.A.M.); coll. Schaum, no other data, 1 ♂ Cat. No. 46 (R.M.): no data, 1 ♂; no data except Walkers Catalogue 52, 62, 1 ♀ (B.M.), Peradeniya, X 1910, coll. R. L. Woglum, 3 ♂♂, 3 ♀♀, Peradeniya, 12 X 1903, coll. W. F. Rosenberg, 4 ♀, Peradeniya, No. 59, no other data, 1 ♀ (U.S.N.M.).

Indonesia (subsp. *abdominalis*): Boloang Mengon don Modajag, North Celebes, IX 1917, coll. W. Kaudern, 1 ♀, Cat. Nat. No. 2: Fort de Kock, Sumatra, XI 1913, coll. Edw. Jacobson, 1 ♂, Cat. No. 33 (R.M.). Java, from P. R. Uhler coll., 1 ♀ (U.S.N.M.).

Philippines (subsp. *abdominalis*): Bataan Province, Luzon, coll. G. Böttcher, 1 ♂ (B.M.). Baguio Benguet, coll. Baker, 2 ♂♂ 1 ♀. Samar Island, coll. Baker, 1 ♂. North west of Panay Island, coll. Baker, 1 ♀ (U.S.N.M.).

Formosa (subsp. *abdominalis*): Grove, 1.5 miles S. of Nodoe, 13 VII 1929, coll. on Lingnan University 5th Hainan Island Expedition 1929, 1 ♂, 1 ♀ (U.S.N.M.).

Eastern Asia (subsp. *abdominalis*): Assam: No. 57, coll. W. Ashmead, 1 ♂ (U.S.N.M.). Siam: Singora, VI 1929, coll. H. M. Smith, 1 ♂. Tha Lo 30 IX 1931, coll. Hugh Smith, 1 ♀ (U.S.N.M.). Vietnam: Annam-Cana, Phanrang Province in *Pinus merkusii* belt at altitude 0-600 metres, 18-22 VIII 1932, coll. M. Poilane, 1 ♀ (U.S.N.M.).

New Guinea (subsp. *blötei*): "Mist Camp" of Netherland Indies—American New Guinea Expedition, 1800 metres, 9 I 1939, coll. L. J. Toxopeus, Holotype ♂, Allotype ♀, 1 paratype ♂, 2 paratype ♀♀ (R.M.). Krisa, Vanimo, Nth. New Guinea, IV 1939, coll. L. E. Cheesman, 1 paratype ♂, Reg No. I 20, 103 (S.A.M.); Goroka, 1550 metres, 10 VI 1955, in light trap, coll. J. L. Gressitt, 1 paratype ♀ (B.P.B.M.).

**Leptocoris rufomarginata** (Fabricius) 1794

Fig. 3 E-G, 4 I

- Lygaeus rufomarginatus* Fabricius, 1794: Ent. Syst., 4: 152. (Type checked in Copenhagen against sketches of genitalia by Dr. Anker Nielsen.) 1803: Syst. Rhyng., 220 (exclude reference to *stolli*).
- Serinetha rufomarginata* Dallas, 1852: List Hem. Ins., 2: 460. Stål, 1868: Kongl. svensk. Vetens.-Akad. Handl., 7 (11): 68. Lethierry & Severin, 1894: Cat. gén. Hém., 2: 123. Distant, 1902: Faun. Brit. Ind. Rhynch., 1: 419. Esaki, 1926: Ann. Mus. nat hung., 24: 157.
- Leptocoris ruformarginatus* Kirkaldy, 1905: Trans ent. Soc. Lond., 350.
- Lygaeus taitense* Guérin, 1830 (1838): Voy Coquille Ins., 2: 178, pl. 12, fig. 15. (Type presumed lost.)
- Serinetha fimbriata* Dallas, 1852: List. Hem. Ins., 2: 462. (Imperfect type in British Museum checked by Mr. R. J. Izzard.)
- Lygaeus flavomarginatus* Matsumura, 1913: Thous. Ins. Japan. Addit., 1: 141, tab. 14, f. 4.
- Leptocoris spectabilis* Breddin, 1901: Allg. Zeitschr. Ent., 6: 113-115. (*Typ. vid.*)
- Leptocoris insularis* Kirkaldy, 1908: Proc. Linn. Soc. N.S.W., 33: 353. (The type cannot be located but all the large specimens of *Leptocoris* seen from Fiji have been *rufomarginata*) China, 1930: Insects of Samoa 2 (3): 103. Blöte, 1934: Zool. Meded., 17: 267.
- Leptocoris fimbriata* Blöte, 1934: Zool. Meded., 17: 267.

As mentioned after the synonymy of *L. abdominalis* in most collections the series labelled *abdominalis* or *ruformarginata* have each been a mixture of these two species. Therefore most of the references above (except Fabricius' or Breddin's original descriptions and references to *insularis*) refer in part also to *abdominalis*.

This is undoubtedly the most variable species in the whole *Leptocoris* complex of the East Asian and Pacific area. It cannot be clearly differentiated into geographic races as can *abdominalis*, or at least not on the material before me. As one example, most female specimens from the Solomon Islands I have seen are typical "*rufomarginata*", very similar to those from the Philippine Islands, whilst males from the Solomon Islands are very similar to some rather fuscous reddish specimens amongst the Queensland Coast series.

The ground colour varies enormously. It is often black, with in the case of the two specimens from Lombok, bright yellow lateral margins to head, pronotum and corium, or in the case of the type "*rufomarginata*" form a reddish head and wide reddish lateral margins to pronotum and corium. The black however may become very reduced or even absent from above making the ground colour red or yellowish; in a pair of ♀ specimens from Misima Island in the Louisiade Archipelago the black on the pronotum is restricted to the collar and depressed callous areas and a large quadrate patch in the hind part of disc, the scutellum is black, but the clavus and inner corium are merely infuscated; in most Micronesian specimens there are two longitudinal black lines on the pronotum (rarely fused into one or absent) and the clavus and inner corium are infuscated. In many specimens the only black above is the black antennae, and in others the membrane, the depressed smooth areas on the pronotum, and the antennae are concolorous with the main reddish or yellow above.

Amongst the forms in which the black is more or less reduced or absent the ground colour is very variable. In specimens from Penang (also one from Siam), the Nicobar Islands, and Sumatra and the Misima Island females it is a bright brick red. In most of the Queensland Coast specimens there is a tendency for a purplish red, and this is very well developed in nearly all the specimens of the small form from Fiji, Samoa and Tonga. From Sipangkat there are three specimens which are a yellowish cyclamen colour, one of these has the central pronotum longitudinally, the scutellum, clavus, and inner corium vaguely infuscated, *i.e.*, the pattern of the *rufomarginata* form. The two males I have seen from Misima Island and the Micronesian specimens are reddish ochraceous and fairly small, one from Misima has two elongate large longitudinal blackish spots on hind part of pronotum and this is generally the case in the Micronesian specimens. The form "*spectabilis*" Breddin is ochraceous above except for the black membrane and brown antennae.

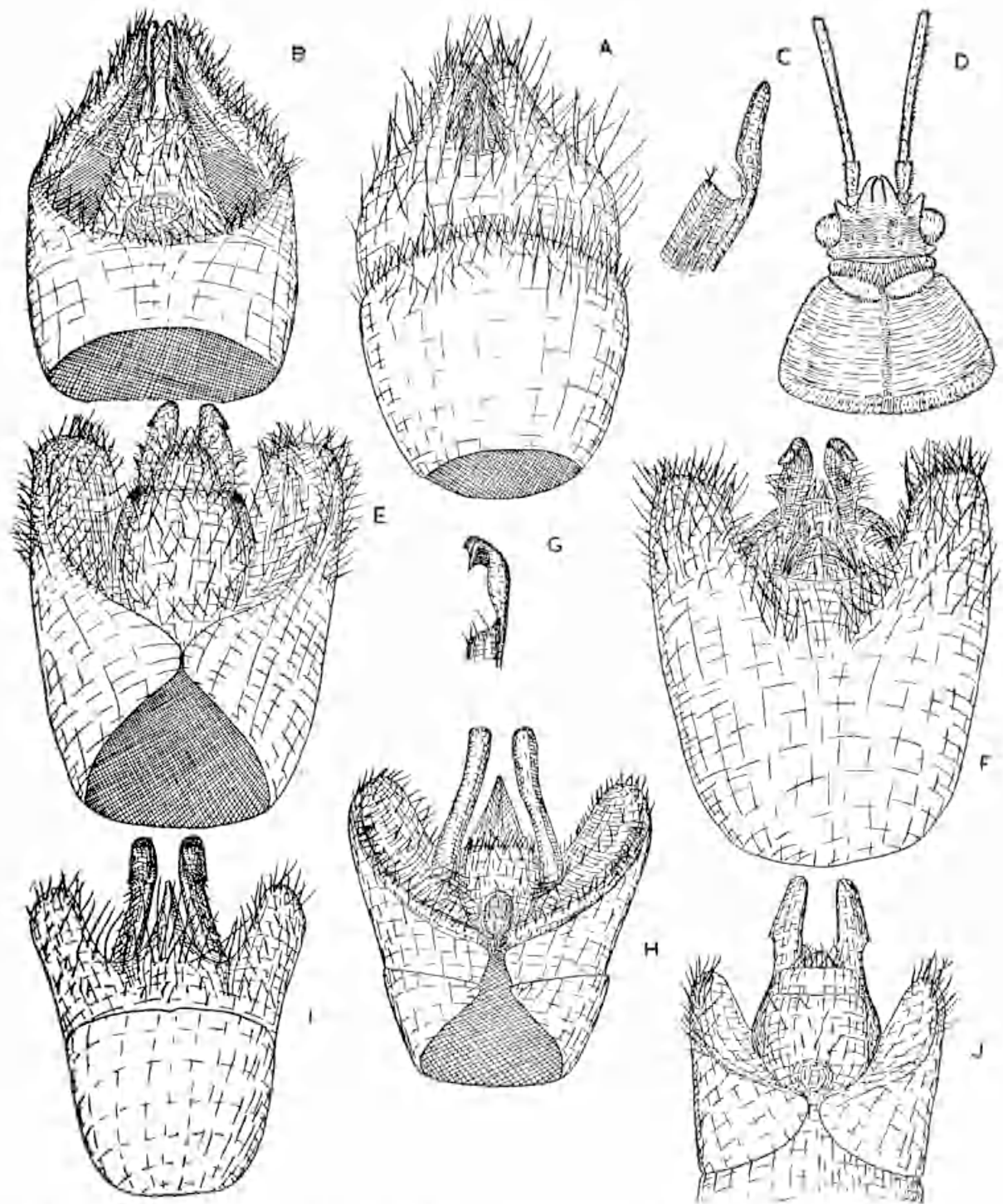


Fig. 3: A-C *Leptocoris abdominalis* (Fab.), A—male genital capsule from above, B—same from below, C—right paramere from above. D *Leptocoris corniculata* (Stal), head and pronotum. E-G *Leptocoris rufomarginata* (Fab.), E—male genital capsule from above, F—same from below, G—right clasper from right hand side. H-I *Leptocoris tagalica* Burmeister, H—male genital capsule from above, I—same from below. J *Leptocoris isolata* (Distant), male genital capsule from above.



Beneath the species is generally black except for the underside of head and the lateral margins of propleura (broadly), mesopleura and metapleura (also upper hind margin of latter) and dorsal margins of abdominal segments broadly (except the sixth which is completely red or yellow) concolorous with pale colour of above surface. In the Sipangkat specimens the underside is yellowish cyclamen tinged with only the merest suggestion of fuscous where there is black in most of the other specimens of the species. The legs, antennae and rostrum of the Sipangkat specimens are a dark cyclamen colour. The two specimens from Lombok with the narrow yellow margins above are bright yellow beneath with black legs (except coxae), antennae, and rostrum, and a black spot on each of mesosternum, mesopleura, and metapleura. The Queensland Coast specimens tend to have little black on the abdomen and a black patch on the underside of head; or to be infuscated only on the pleurae. This is also true of one Sumatran and one Luzon example. Many of the specimens have a white encrustation over the black beneath. The abdomen of Polynesian specimens tends to be a vaguely infuscated reddish beneath.

Structurally the species is very similar in size and form to *abdominalis*. Polynesian specimens tend to be rather smaller than is usual for the species. The head is shorter and broader, there is a central longitudinal sulcus running back from the base of the tylus. There are two grooves running down obliquely from midline to insertion of antennae but they are very shallow and very broad. The rostrum reaches base of second abdominal segment.

The pronotum is narrow anteriorly, broad posteriorly as in *abdominalis* but the disc is fairly raised posteriorly and the lateral margins are not so curved outwards. The anterior portion of the pronotum is rather depressed, thus the pronotum is not so nearly coplanar as in some species. The central keel is fairly obsolete.

The species can easily be distinguished from all others on the shape of the genital capsules. Through all this series of varied coloured specimens I have examined I have seen only the one type of capsule in each sex. I have had no hesitation in lumping all these forms together under this one species solely on this character alone. It is apparent in the other species of the genus that where specific differences do occur the variation in the genitalia, especially those of the male are very marked. In fact in only two species is there even a semblance of difficulty in separating them on male genital characters, *i.e.*, *tagalica* Burmeister, and *isolata* (Distant). In *rufomarginata* the genitalia of the male and female are very distinctive and very constant.

The male genital capsule has the penultimate segment produced into two broad latero-ventrally flattened pilose lobes. These lobes are feebly convex on the ventero-lateral surfaces and almost flat on the dorsal interior ones. Ventrally the penultimate segment is produced between the claspers as a triangular shaped, short arched plate, directed upwards at about 45°. The male claspers are quite elaborate, they begin basally almost triangular in cross section, then become almost flat, broadish, and sinuate and apically they turn ventrally and have a lateral hook on the outer surface.

The female genital capsule has the upper valves produced as club shaped, very pilose processes which are flat (or even slightly concave) on their inner surfaces like most other species but these clubs are completely devoid of spines. The lateral and ventral pairs of valves are also quite distinct. The basal parts of the ventral valves are convex only near their inner margins and beneath appear to give off membranous processes which protrude up under the lateral valves.

In both sexes the genital capsules are reddish or yellowish with yellow pilosity.

As already referred to this species has often been confused with the preceding, amongst the various collections before me there are specimens, male and female, of both species labelled *abdominalis* Fabr. Sometimes the similarity is very great indeed. Amongst the Rijksmuseum material are two specimens, both males, that look almost identical from above and below, both are red and would in the past have been put confidently as *abdominalis*. One of these (Cat. No. 33) from Fort de Kock, Sumatra, is an *abdominalis*, the other (Cat. No. 27) from Pulu Pandjang, Sumatra, is a *rufomarginata*.

The two species can be separated at a glance by the genitalia, and generally the essential genital characters can be seen without even dissecting the genital capsule out. In the male of *abdominalis* the lateral lobes of the penultimate segment are rounded and convergent whilst in *rufomarginata* they are broad, flattish and somewhat divergent. The claspers of *abdominalis* are a long sinuous spine apically becoming a curved plate basally, the claspers of *rufomarginata* are hooked apically and have a short spine on their outer surface, thence they widen and become a sinuous plate and finally basally become almost triangular in cross section.

The upper valves of the female capsule in both species are entirely devoid of spines (unlike all other species of the genus from the region) but have a long pilosity. But in *abdominalis* the upper valves are

in a primitive condition and are in the form of not particularly prominent plates, in *rufomarginata* they are club shaped and very prominent like all other species of the genus.

Length: 13-29 mm.

*Loc.*

Lower Siam: Trong, coll. Dr. W. L. Abbott, 1 ♀ (U.S.N.M.).

Nicobar Islands: No precise locality, 1903, coll. G. Rogers, 1 ♀ (B.M.).

Malay Peninsula: Penang, Rosenberg Collection, 1 ♂ (headless), 1 ♀ (U.S.N.M.).

Indonesia: Sumatra: Pulu Pandjang, Sim, Sumatra, V 1913, coll. E. Jacobson, 1 ♂, Cat. No. 27: no precise locality, coll. Muller, 1 ♀, Cat. No. 2 (R.M.). Padang, no other data, 2 ♂ ♂ (Zool. Inst. Halle).

Java: Samarang, I 1910, coll. E. Jacobson, 1 ♀, Cat. No. 41 (R.M.); Bogor, I, coll. A. M. Lea and wife, 1 ♀ (S.A.M.). No precise locality, No. 53, P. R. Uhler collection, 1 ♂ (U.S.N.M.). No precise locality or date, 1 ♀ (Zool. Inst. Halle).

Borneo: Labuan Island, coll. C. T. McNamara, 1 ♀; Sandakan, coll. C. T. McNamara, 1 ♀ (S.A.M.). Sandakan, coll. Baker, 6 ♂ ♂, 4 ♀ ♀, 2 without abdomens. Mt. Kinabalu, North Borneo, coll. G. Haslam, donated B.P. Clark, 4 ♂ ♂, 1 ♀ (U.S.N.M.).

Celebes: Tondano, no other data, 1 ♀, Cat. No. 2 (R.M.). Toli-Toli, North Celebes, XI-XII 1895, coll. H. Fruhstorfer, 1 ♀, Reg. No. 40, Breddin coll. and Breddin's type of *Serinetha spectabilis* (Deutsches Entomologisches Institut Berlin-Friedrichshagen). Same date, No. 4, C. F. Baker Collection 1927, 1 ♀ (U.S.N.M.).

Lombok: Rindjani: Segard Anak, 2000 metres, IX 1936, coll. R. van de Veen, 1 ♀ (R.M.).

Sumbawa: Col. van Lansberge, no other data, 1 ♀, Cat. No. ? (R.M.).

Sipangkat: 10-14 IX 1929, coll. Snellius Expedition, 2 ♂ ♂, 1 ♀ (R.M.).

Timor: Coll. Muller, no other data, 1 ♂, Cat. No. 3 (R.M.).

There are a further five specimens of this species in the collection of Zool. Inst. Halle, 4 ♂ ♂, 1 ♀, 3 of them belonging to an interesting yellow form very similar in appearance to *L. abdominalis taprobanensis* which are utterly without label but I think probably come from somewhere in the Indonesian Archipelago.

Philippines: Luzon: Mt. Makiling, coll. Baker, 1 ♂, 2 ♀♀. Manilla, No. 18, P. R. Uhler collection 1 ♀ (U.S.N.M.).

Samar: Coll. Baker, 1 ♀ (U.S.N.M.).

Mindanao: Surigao, coll. Baker, 3 ♂♂, 2 ♀♀ (U.S.N.M.). Surigao, from Taeuber Collection, 1 ♂. Momungan, North Mindanao, coll. G. Böttcher, 1 ♂ (B.M.).

Caroline Islands; Palau Islands: Koror I., limestone ridge S. of Islet; 21 I 1948, coll. H. S. Dybas, 1 ♀. Koror I., IX 1952, coll. N. L. H. Krauss, 1 ♀. Koror I., XII 1954, coll. J. W. Beardsley, 2 ♂♂, 2 ♀♀, 3 from *Allophylus* sp. Koror I., 18 IV 1957, coll. C. W. Sabrosky, 3 ♂♂. Ngerkabesang I., 24 IV 1957, coll. C. W. Sabrosky, 1 ♀. Urukthapel (Ngerukdabel) I., 16 VIII 1953, No. M. 455, 1 ♀ (B.P.B.M.).

Ponape: Kolonia-Jokaji, 24 VII 1939, coll. Teiso Esaki, 1 ♀ (K.U.). Nanue Islet, VI-IX 1950, coll. P. A. Adams, 1 ♀ (B.P.B.M.).

New Guinea: Mt. Lamington, North East Papua, 1,300-1,500 feet, coll. C. T. McNamara, 1 ♀; Misima I., Louisiade Archipelago, coll. Rev. R. J. Andrew, 1 ♂, 1 ♀ and coll. H. K. Bartlett 1 ♂, 1 ♀ (S.A.M.). Normanby I., Papua, Wakaiuna, Sewa Bay, 8 I 1957, coll. W. W. Brandt, 1 ♀ (B.P.B.M.).

Solomon Islands: No precise locality, VII-VIII 1909, coll. W. W. Froggatt, 1 ♂, 1 ♀ (C.S.I.R.O.). Guadalcanal, XII 1920, coll. J. A. Kutsche, 6 ♂♂, 9 ♀♀. Ditto, I 1921, coll. J. A. Kutsche, 2 ♂♂, 1 ♀ (B.P.B.M.).

Fiji Island Group: Suva, Viti Levu, 11 IX 1921, coll. Saunders, 1 ♀ (Fiji Dept. Agr.); Suva, Beach Road, 14 II 1933, coll. C. H. Edmondson, 1 ♂. Moala I., ex coconut, 7 IX 1924, coll. R. H. Beck, 31 ♂♂, 2 ♀♀. Mothe-Lau, 14 VIII 1924, coll. E. H. Bryan Jr., 1 ♀ (B.P.B.M.).

Tonga Islands: Eua I., 8 V 1928, coll. H. S. Ladd, 2 ♂♂, 4 ♀♀ (B.P.B.M.).

Samoa Island Group: Savaii Island, coll. W. von Bülow, 1 ♀, Cat. No. 1 (R.M.). Upolu Island, Afiamalu, 19 VI 1940, 2,200 feet, at light, coll. Swezey & Zimmerman, 1 ♀. Same data, except date 10 VI 1940, 2 ♂♂. Same data, except date 18 VI 1940, 1 ♀. Same data except date 24 VI 1940, 9 ♂♂, 12 ♀♀. Same data, except date 30 VI 1940, 1 ♂, 3 ♀♀. Tapatapao, 17 VI 1940, 1,000 feet, at light, coll. Swezey & Zimmerman, 2 ♀♀. Apia, IX 1926, coll. G. P. Wilder, 1 ♂ (B.P.B.M.).

Queensland: Rockhampton, no other data, 1 ♀: Kuranda, coll. F. P. Dodd, 1 ♀ (S.A.M.); Ayr, 25 XI 1954, coll. G. Saunders, 1 ♂; Lawes, 21 XII 1952, coll. E. Jones, 1 ♀; Brisbane, 12 VI 1952, coll. M. W., 1 ♂; Brisbane, V 1949, coll. Talbot, 1 ♀ (U.Q.).

***Leptocoris tagalica* Burmeister 1834**

Fig. 3 H, J, 4 J

Plate XLVIII

*Leptocoris tagalicus* Burmeister, 1834: Nov. Act. Acad. Leop., 16: Suppl., 299.

*Serinetha tagalica* Dallas, 1852. List Hem. Ins. Brit. Mus., 2: 460.

*Serinetha lurida* Dallas 1852: *loc. cit.*, 461. Dist., 1901: Ann. Mag. nat. Hist., (7) 7: 429. (Type in British Museum checked by Mr. R. J. Izzard.)

*Leptocoris vulgaris* Bergroth, 1916: Proc. R. Soc. Vic., 29: 32. (Type presumed lost.)

*Leptocoris taitensis* Cheesman, 1926: Ann. Mag. nat. Hist., (9) 18: 369, figs. (nec Guérin). (Type in British Museum checked by Mr. R. J. Izzard.)

*Leptocoris ahmei* Cheesman, 1927: Trans. ent. Soc. Lond., 75: 156 (n. name for *taitensis* Cheesman).

This, like the previous species, is one of the most wide spread of the species of the genus in the region, ranging from Tahiti to the Philippines and far into Central Australia. It is variable in size and also in ground color and it is not surprising that it has been described under such a variety of names.

It is far from certain that the correct name is *tagalica*. Burmeister's original type cannot be traced and it is completely unsafe to try and place any Indo-Pacific species of *Leptocoris* of this size and color without an examination of the genitalia. In Dallas' description of *vicina* which follows immediately after his reference to *tagalica* he mentions several differences between his *vicina* and what he has listed as *tagalica*. This species fits Dallas' concept of *tagalica*, but we cannot be sure Dallas' *tagalica* is Burmeister's *tagalica*. If the type is ever traced it could turn out it is what I have called *vicina* and will replace that name, then the next available name for this species is *lurida* Dallas. *Tagalica* and *vicina* were both described from the Philippines, hence the type localities are of little help.

The ground colour is generally a purplish red, but it is often brick red (this is usually the case with the small Central Australian form described as *L. vulgaris* by Bergroth) or scarlet or even a brownish yellow as is the case in a series of specimens from Cloncurry, Queensland. Two specimens in the Rijksmuseum collections identified by H. C. Blöte as *longirostris* Dallas have the pronotum brownish yellow (except for the smooth depressed areas which are purplish red and in one specimen the lateral margins behind the calli are tinged with red) whilst the rest of the body above (except antennae) is purplish red. Specimens from Saipan and Tinian are a deep chocolate brown with a black head.

The long hairs on the head, antennae, legs and sides of pronotum are blackish brown, the fine pilosity of the body is golden yellow.

The antennae are brownish black or black, generally the first segment is paler near base, and with a moderate thickness of short stiff blackish brown hairs. The head is as broad basally as in all the other species but the region of the tylus and the jugae seems narrower and more elongate. There are generally a few scattered stiff hairs on the head and a fine golden pilosity. The eyes and ocelli are generally purplish red but in the yellow Cloncurry specimens are bright red. There is a short longitudinal impressed line just in front of the ocelli, a tumescence behind each eye and an oblique curved ridge in front of the eye leading down to insertion of antennae. The pronotum has the anterior smooth areas convex and almost transverse, in most specimens they are concolorous with, or only slightly darker than the ground colour (including the Cloncurry specimens where they are yellow) but in the two Rijksmuseum specimens with the yellow pronota they are a purplish red. In front of these calli the pronotum is elevated into a narrow quite raised shallowly triangular area which often has a few sparse hairs. The lateral margins of the pronotum behind the calli are rather selvaged and almost straight or very shallowly concave. The posterior margin is very feebly convex and slightly depressed. The disk of the pronotum behind the calli is flat or almost so, becoming depressed before the lateral margins and immediately before the hind margin. There is a fine longitudinal keel running from the calli to almost the hind margin. The lateral margins have a moderately dense development of stiff black hairs.

The scutellum is elevated and flat or even slightly concave on top, the lateral margins are strongly depressed and the disc is depressed before the apex.

The coriaceous parts of elytra, scutellum, pronotum and head are covered with a fine golden pubescence. The membrane is black becoming broadly brown near the apex. Specimens from the Mariana Islands have a paler membrane.

Rostrum and legs (except coxae) concolorous with antennae, brownish black or black. Thoracic pleurae in southern specimens generally mainly blackish with a red or yellow spot (depending on the ground colour) well above each coxa, also a thin line along apical margin of several of the ventral abdominal segments blackish. In Indonesian and Polynesian specimens these latter black areas become very obsolete or absent altogether. The coxae are always reddish or yellowish depending on the ground colour. The rostrum reaches to or almost to base of the fourth abdominal segment. In specimens from Saipan and Tinian the abdomen beneath is paler than the ground colour.

The genital capsules of both the males and females are not such a reliable guide to the identity of the species. They readily distinguish it from all the preceding species, but the female is hardly distinguishable from the next species, and in the male the characters are not as clear cut as we have been encountering so far.

The male genital capsule has the penultimate segment produced laterally into prominent pilose lobes which are convex on the ventero-lateral surface and noticeably concave and more pilose on the inner dorsal surfaces. Ventrally the penultimate segment is produced between the claspers as a prominent triangular process. The claspers are fairly simple and are feebly hooked on their underside towards the apex and turn somewhat though not markedly ventrad. The claspers lack the elaborate structure of the preceding species and the lateral lobes of the penultimate segment are much longer in relation to the length of the claspers than in either the preceding species or in the one following. The capsule is generally the same general colour as the rest of the insect but in Saipan and Tinian specimens it is black.

The female genital capsule has the upper valves produced into club-like structures which are pilose and have a number (>20) of strong spines. The clubs are flat on their inner surfaces. The lateral valves are just perceptible as flat plates with a terminal pilosity beneath the upper valves. Ventral valves fairly convex.

Length: 9-13 mm. Specimens from Central Australia are consistently small and could be considered perhaps as a separate race to which the name *vulgaris* Bergroth would have to apply. They are

also more uniformly reddish than the Queensland Coast specimens. On the other hand specimens from Central New South Wales and Central Queensland tend to bridge the gap between the typical *vulgaris* type and the purplish red or yellow coastal forms in both colour and size. It is perhaps best to leave this point to be clarified later in the light of additional material from inland New South Wales and Queensland. Specimens from Saipan and Tinian are also very small and could possibly also be regarded as a good subspecies, but again, it would be desirable to see material from more Micronesian localities.

*Loc.*

Philippines: North Luzon: Pr. Bontoc Tinglayan, 1000 metres, coll. G. Böttcher 1 ♀; Los Banos, coll. G. Böttcher 1 ♂; Mt. Banahao, 2000, coll. G. Böttcher, 1 ♀ (B.M.).

Mariana Islands: Saipan: Chalan Kanoa, Haw. 4061, 11 I 1949, No. 2951, on *Physalis peruviana*, 4 ♂♂. No precise locality, Haw. 4645, 25 II 1949, No. 6318, 3 ♂♂, 3 ♀♀ (U.S.N.M.). No precise locality, 11 I 1949, coll. K. L. Maehler 2 ♂♂, 4 ♀♀. Ditto, 25 II 1949, 4 ♂♂, 1 ♀. As Lito, II 1958, coll. N. H. L. Krauss, 1 ♀ (B.P.B.M.).

Tinian: Tinian Harbour, 20 III 1945, coll. H. S. Dybas, 2 ♂♂ (C.N.H.M.). 9 VI 1946, No. 493, coll. H. K. Townes, 2 ♂♂ (B.P.B.M.).

Indonesia: Sumatra: Tanjong Morawa, Serdang, N.E. Sumatra, coll. Dr. B. Hagen 1 ♂, Cat. No. 22 and 1 ♀, Cat. No. 8 (B.M.).

Celebes: Bankala, coll. J. C. van Hasselt, 1 ♂ (B.M.).

Soembawa: Sima, 27 VI 1929, coll. I. M. Mackerras, 2 ♂♂, 1 ♀ (C.S.I.R.O.).

Polynesia: New Hebrides: Tanna, IX 1930, coll. L. E. Cheesman, 1 ♂ (B.M.).

Samoa: Utumapu, Upolu, 7 XI 1954, coll. R. A. Cumber, 2 ♂♂, 3 ♀♀ (U.Q.).

Society Is.: Tahiti, 6 III 1925, coll. L. E. Cheesman, 1 ♀ (B.M.).

Australia: Queensland: Dunk Island, 25 VIII 1927, coll. F. A. Perkins, 1 ♀ (U.Q.); Magnetic Island, coll. G. F. Hill, 1 ♀ (B.M.): same data, 1 ♂, 1 ♀ (S.A.M.); Cloncurry, 8 IV 1947, coll. H. Bell, 1 ♂, 5 ♀♀, 2 nymphs; Julia Creek, 1 I 1946, coll. H. Bell, 1 ♀ (U.Q.); Powella, Aramac, VII 1920, coll. F. Bradshaw, 1 ♂, 2 ♀♀, Reg. No. K43437 (A.M.); Rockhampton to Yeppoon, 5-15 V 1956, coll. J. Baldwin, 1 ♂ (S.A.M.): Brisbane, on wild hop seed (? *Dodonaea* sp.), 11 XII 1927, coll. McLachlan, 1 ♂; Brisbane, Botanic Gardens, 3 XI 1952, coll. Dr. T. E. Woodward, 3 ♂♂, 3 ♀♀; Brisbane, III 1955, coll. J. Thapa, 1 ♀:



Brisbane, 3 IV 1955, coll. D. J. Woodlard, 1 ♀ : Brisbane, VII 1956, coll. J. O'Donohue, 1 ♂ : Stanthorpe, 10 XI 1922, coll. F. A. Perkins, 1 ♀ (U.Q.) : Stanthorpe, 9 X 1922, 2 ♂ ♂ (B.M.). No precise locality from C. French Junior collection presented 15 XI 1911, 1 ♂, 1 ♀ (N.M.) ; Cunnamulla, 22 X 1938, coll. N. Geary (A.M.).

New South Wales: Gordon, 30 V 1943, coll. A. Musgrave, 1 ♀ : Watercourse near Moree, XI 1933, coll. A. Musgrave 2 ♂ ♂ (A.M.) ; 40 miles west of Wanaaring, 30 X 1949, coll. S. J. Paramonov, 2 ♂ ♂, 2 ♀ ♀ ; Brewarrina, 1914, coll. W. W. Froggatt, 1 ♀ (C.S.I.R.O.) ; Yanda, 4 I 1954, coll. K. M. Moore, 1 ♂, 1 ♀ (A.M.) ; Belmont, 11 IX 1953, coll. A. W., 1 ♀ (U.Q.) . Upper Williams River, X 1926, coll. A. M. Lea & F. E. Wilson, 1 ♂ (N.M.).

Northern Territory: McArthur Station, 6 II 1912, coll. G. F. Hill, 1 ♂ (N.M.) ; Murchison Range, 1932, coll. Basedow, 1 ♂, 1 ♀ : Coniston Station, coll. M. W. Mules, 5 ♂ ♂, 5 ♀ ♀ (S.A.M.) ; 59 miles N.W. of Alice Springs, 7 V 1952, coll. N.W. Australian Party from Aust. Mus., 1 ♂, 2 ♀ ♀ (A.M.) ; Undulya Gap, 6 VIII 1947, coll. C. W. Brazenor, 1 ♂ (N.M.) : 1 mile E. of Simpsons Gap, 27 VI 1951, coll. W. L. Brown, 2 ♂ ♂ : Palm Valley, 30 VIII 1956, coll. N. B. Tindale, 1 ♂ : Palm Valley, VIII-IX 1957, coll. N. Mollett, 1 ♂, 2 ♀ ♀ : Henbury Station, 14 X 1953, coll. G. F. Gross, 1 ♂, 2 ♀ ♀, Reg. No. E.S.I. 1181 (S.A.M.).

Western Australia: Beverley, 1913, coll. D. Bone (C.S.I.R.O.).

### ***Leptocoris isolata* (Distant) 1914**

Fig. 3 J, 4 A

*Serinetha isolata* Distant, 1914: Ann. Mag. nat. Hist., (8) 13: 179, 1920: *op. cit.* (9) 6: 148. (Type in British Museum checked by Mr. R. J. Izzard.)

*Leptocoris isolata* Blöte, 1934: Zool. Meded., 17: 267.

*Leptocoris lariversi* Usinger, 1952: Proc. Hawaii ent. Soc., 14: 520. fig. (*Paratyp. vid.*) New synonymy.

This is a species of uniform (and in *Leptocoris* average) size and pretty constant appearance occurring only so far as is known along coastal New Guinea, the Solomon Islands, some islands between these two (Lousiade Archipelago), and the Marshall Islands.

The ground colour is fuscous brown, reddish, or reddish ochraceous above. In infuscated specimens the lateral regions of the head, anterior and lateral margins of pronotum and the outer base of hemelytra are

ochraceous, reddish ochraceous, or reddish. Antennae, membrane and legs black or blackish brown. The calli on the pronotum, usually the scutellum and sometimes a small quadrate area between eyes in otherwise not infuscated specimens blackish or purplish.

The longer hairs of head, antennae, legs and sides of pronotum and the overall very fine pilosity golden or whitish.

Antennae as in all other members of the genus with a short thick golden (or perhaps blackish) pilosity. The head is very similar in appearance to the preceding species, the eyes and ocelli are bright red.

The anterior smooth areas of the pronotum are not quite transverse, convex. In infuscated specimens they are concolorous with the fuscous centre of the pronotum, in others they range from red through bright purple and black and all stages may be seen in a series of specimens from any one locality. In front of these the pronotum is slightly raised into a narrow, shallowly triangular area which terminates laterally as two feeble pilose tumescences. The lateral margin of the pronotum behind the calli is shaped like a selvage, almost straight but with a feeble concavity just behind the ocelli. The hind margin is convex, ovate and depressed. The disc of the pronotum behind the calli is flat or almost so, becoming depressed before the lateral and hind margins, there are five feeble tumescences along the line where it dips to meet the hind margin. There is an obsolete central longitudinal keel.

The scutellum is elevated and flat or even slightly concave on top, the lateral margins are strongly depressed and the disc is depressed before the apex.

Rostrum and legs (except coxae) concolorous with antennae, reddish or brownish black or black. Thoracic pleurae generally blackish or infuscated with broad ochraceous or reddish borders, sterna ochraceous or reddish. Abdominal sterna and pleurae blackish with upper half of pleurae ochraceous or reddish, last segment wholly reddish or ochraceous. Rostrum reaching to middle of third true (2nd visible) abdominal segment.

The male genital capsule is not very distinct from that of the preceding species and I cannot find characters in the female genitalia to distinguish the two.

The male genital capsule has the penultimate segment produced laterally into prominent pilose lobes which are convex on the ventero-lateral surfaces and noticeably concave and more pilose on the inner

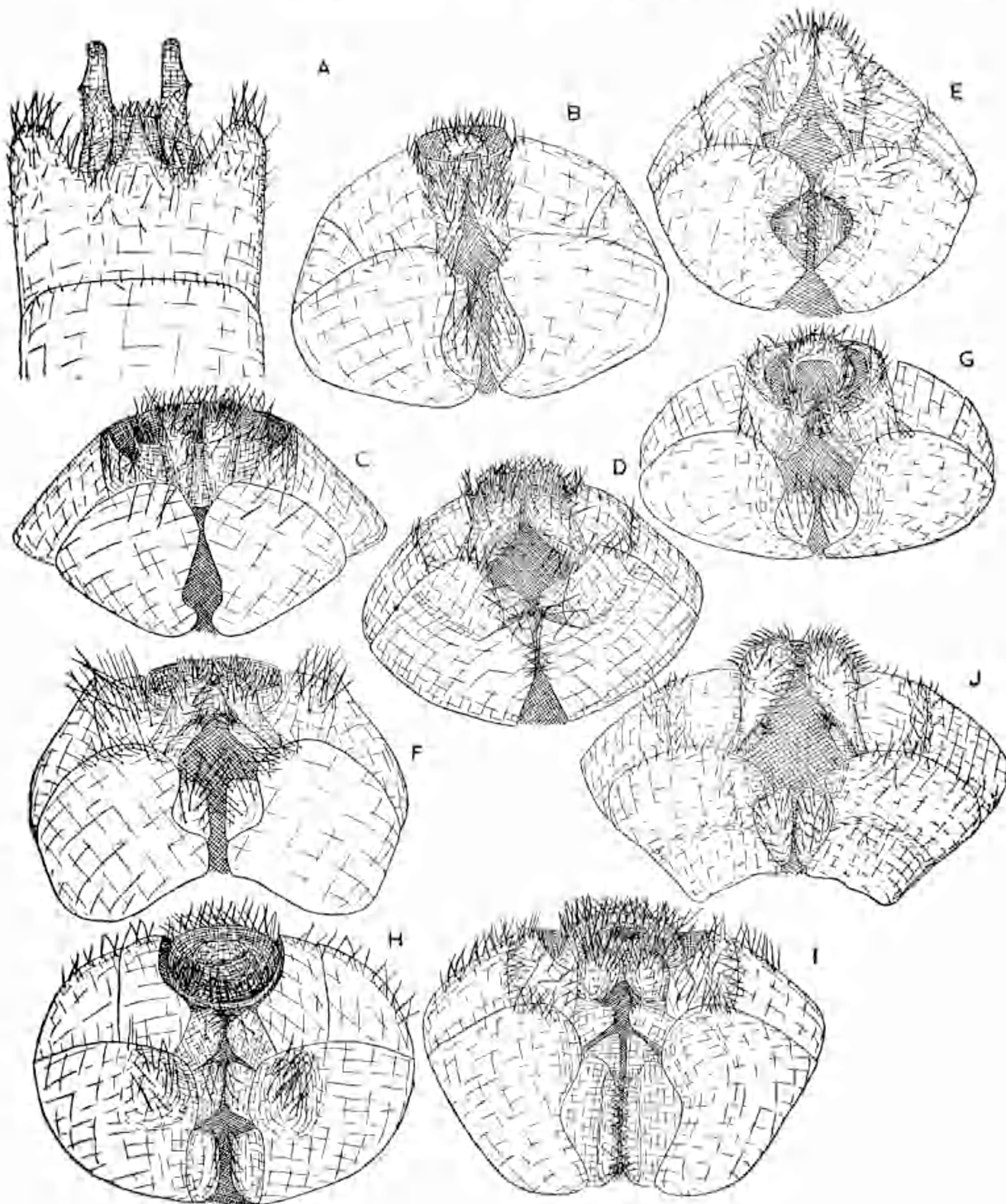


Fig. 4: A *Leptocoris isolata* Distant, male genital capsule from below. B *Leptocoris augur* (Fab.), female capsule from below. C *Leptocoris novaeuscula* Blöte, female genital capsule from below. D *Leptocoris combatorensis* sp. nov., female genital capsule from below. E *Leptocoris mitellata* Bergroth, female genital capsule from below. F *Leptocoris vicina* (Dallas), female genital capsule from below. G *Leptocoris subrufescens* (Kirby), female genital capsule from below. H *Leptocoris abdominalis* (Fab.), female genital capsule from below. I *Leptocoris rufamarginata* (Fab.), female genital capsule from below. J *Leptocoris tagalica* Burmeister, female genital capsule from below.

dorsal surfaces. Ventrally the penultimate segment is produced between the claspers as a fairly prominent triangular process. The claspers are more robust than those of *tagalica* and are strongly hooked on their underside toward the apex, and somewhat excavated beneath in the middle. They turn somewhat but not markedly ventrad at the apex. The claspers are much longer in relation to the parandria than those of *tagalica* and this is the one definite distinguishing feature between the species. The genital capsule is also paler than *tagalica* and in New Guinea and Louisiade Archipelago specimens the claspers are a bright yellow.

The female capsule is to all intents and purposes the same as that of *tagalica*.

Length: 11-16 mm.

*Loc.*

New Guinea: Toem, Dutch New Guinea, 10 II, 20 II and 20 IV 1945, coll. B. B. Vogtman, 3 ♂♂. Nadzab, Markham River Valley, VI 1944, coll. K. V. Krombein 1 ♂ (U.S.N.M.). Pt. Moresby, Papua, IX 1949, coll. N. H. L. Krauss, 1 ♀. Normanby Island, Papua, Waikuna, Sewa Bay, 21-31 XII 1956, coll. W. W. Brandt, 1 ♀ (B.P.B.M.).

Louisiane Archipelago: Misima Island, coll. Rev. H. K. Bartlett, 4 ♂♂, 4 ♀♀ (S.A.M.).

Solomon Islands: Guadalcanal, II 1921, coll. J. A. Kusche, 4 ♂♂ 4 ♀♀ (B.P.B.M.).

Marshall Islands: Kwajalein Atoll; Bwije Island, 30 I 1945, coll. H. S. Wallace, No. 1247, 2 ♂♂, 2 ♀♀. Berlin Island, 30 I 1945, coll. H. S. Wallace, No. 1256, 2 ♂♂, 2 ♀♀. Kwajalein Island, the airfield, 17 VIII 1946, coll. R. G. Oakley, No. 1593, 1 ♀; no precise locality, 22 IV 1948, coll. K. L. Maehler, 6 ♂♂. Namu Atoll; Majkon (Kaginen) Island, 25 X 1953, on *Allophylus*, coll. J. W. Beardsley, 7 ♂♂, 5 ♀♀ (B.P.B.M.). Jaluit Atoll; Imroj Island, 24 VIII 1946, No. 1851, coll. Townes, 1 ♂. Paratype of *Leptocoris lariversi* Usinger (U.S.N.M.). Majuro Atoll; Uliga Island, 3 XI 1953, on *Allophylus*, coll. J. W. Beardsley, 5 ♂♂, 1 ♀. Arno Atoll; Ine Island, 30 VII 1950, coll. Ira La River, 1 ♂, 6 ♀♀. No precise locality, 19 VII 1950, coll. Ira La Rivers, most of the specimens also bear the name Earl Stone on a single label, 7 ♂♂, 3 ♀♀, 1 nymph (B.P.B.M.). Ratak Island Chain; no precise locality, coll. A. von Chamisso, 1 ♀ (R.M.). Ratak Island Chain; no other data except one specimen (♂) bears the name *indecorus* Esch. (= Eschscholz ?) which appears to be a *nomen nudum* as I cannot trace its publication, 2 ♂♂ (Zool. Inst., Halle).

***Leptocoris marquesensis* Cheesman 1926**

*Leptocoris marquesensis* Cheesman, 1926: Ann. Mag. nat. Hist., (9) 18: 368, figs. 1927: Trans. ent. Soc. Lond., 156.

I have not seen this species. From the original description it is fairly close to *isolata* Distant, but differs in that the claspers have a dorso-lateral tubercle on the outer sides. This point has been checked for me by Mr. Izzard. The female is unknown.

Deep red, ocelli bright red; tylus, vertex, calli of pronotum, basal two thirds of disc of pronotum, hemelytra (except basal half of costal margin) suffused with black and showing a dark purplish colour. Antennae, rostrum, legs (except the red coxae and trochanters) and hemelytral membrane black. Vertex with second to fifth segments obscurely suffused with black.

Tylus arched, vertex strongly sculptured. Rostrum reaches beyond middle of third abdominal segment. Disc of pronotum densely but finely rugosely punctate, calli transverse. Pronotal collar with anterior margin lightly reflexed and sides tuberculate; disc slightly rounded at the base. Hemelytra exceeding abdomen by one fifth of their length.

Length: 12 mm.

*Loc.*

Marquesas Islands (Fatu-hiva).

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